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The Summary of the Cooperative Experiment
on Wigley Parabolic Model in Japan

The executive members

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Abstract

(International Towing Tank Conference)

The 16th ITTC Resistance Committee made a proposal of cooperative experimental research program for ship resistance and flow around hull to construct standard data base. In Japan ^{four} three organizations, the University of Tokyo (UT), Ship Research Institute (SRI) and Ishikawajima-Harima Heavy Industries Co.,Ltd.(IHI) responded to the proposal of the Committee and Yokohama National University (YNU) joined this program in the later time. They conducted the experiments on ^{the} Wigley parabolic model in order to investigate the scale effect of ship resistance using geosim models of a 6 m, length in IHI, 4 m, length in SRI, 2.5 m, length in UT and 2 m, length in YNU. The experiments were separately performed on the following items and cooperatively analyzed.

- (1) Resistance test,
- (2) Wave pattern analysis,
- (3) Wake survey,
- (4) Wave profile measurement, and
- (5) Pressure measurement on hull surface.

(cont)

YNU separately performed the measurement of boundary layer around the hull. ^{also}
 performed. The report of the cooperative experiment was presented to the Resistance
 Committee of the 17th ITTC at Varna, Bulgaria, in September, 1983. This paper
 describes the summary ^(2CS) of the report, extracting principal data of experiments in order
 to serve as a reference for the theoretical prediction of ship resistance. \star

Nomenclature

C_T	$R_T / \frac{1}{2} \rho U^2 S$	Total resistance coefficient
C_W	$R_W / \frac{1}{2} \rho U^2 S$	Wave resistance coefficient derived from towing test
C_{wp}	$R_{wp} / \frac{1}{2} \rho U^2 S$	Wave resistance coefficient derived from wave pattern analysis
C_{FO}		Frictional resistance coefficient (Schoenherr)
C_{PR}		Resistance coefficient derived from integrating hull surface pressure
C_p		Pressure coefficient = $(p - p_0) / \frac{1}{2} \rho U^2$
Fn		Froude number = U / \sqrt{gL}
S		Wetted surface area at rest defined by $S = C_s \cdot L(2D+B)$ $C_s = 0.661$
L		Waterline length (= L_{pp} for Wigley model)
B		Beam at midship
D		Draft at midship
H, H_0		Total head ($H_0 = U^2/g$)
Rn		Reynolds number = LU/γ
THL		Total head loss = $(H_0 - H)/H_0$
U		Model speed of advance
b		$B/2$
$d_F, \Delta d_F$		Draft at FP, its increase from the rest
$d_A, \Delta d_A$		Draft at AP, its increase from the rest
g		Gravitational acceleration = 9.8 m/sec^2
k		Three dimensional form factor on flat plate skin friction
k_0		Wave number = g/U^2

l	$L/2$
t	Trim (positive for bow up) = $(d_A - d_F)/L$
τ	$2k_0 \cdot L \cdot t$
s	Sinkage = $(\Delta d_F + \Delta d_A)/2L$
σ	$2k_0 \cdot L \cdot s$
ξ	Nondimensional wave elevation = $k_0 \zeta(x)$
$\zeta(x)$	Wave elevation
ν	Kinematic viscosity
ρ	Mass density
x, y, z	Coordinate system fixed in space
x', y', z'	Coordinate system fixed in ship
FR	Free to sink and trim
FX	Fixed to sink and trim
S-FR.T-FX	Free to sink, fixed to trim

1. General notes

A) Model size

	IHI	SRI	UT	YNU
L (m)	6.0	4.0	2.5	2.0
B (m)	0.6	0.4	0.25	0.25
D (m)	0.375	0.25	0.156	0.125

$$\text{Hull form; } y = B/L \left[1 - (2x/L)^2 \right] \left[1 - (z/D)^2 \right]$$

B) Items of experiment

	IHI	SRI	UT	YNU
1 Resistance test	FR	FR,FX	FR,FX, S-FR.T-FX	FR,FX
2 Wave pattern analysis	FR	FR,FX	FR,FX, S-FR.T-FX	FR
3 Wake survey	FR	FR	FR	FR
4 Wave profile on hull	FR	FR,FX	FR,FX, S-FR.T-FX	
5 Pressure on hull	FR	FR	FR, FX	

C) Boundary condition

	IHI	SRI	UT	YNU
Turbulent stimulator stud				
Height*Spacing (mm) at x/l=-0.9	3*10	3*10	2*10	2*10
Tank section, BT*DT (m)	10*5	18*8	3.5*2.35	8*3.5
Towing height from keel (mm)	330	255	103	
Speed measurement	Current speed	Ground speed	Ground speed	Ground speed

2. Results of resistance test and wave analysis

Figure 1 shows the total resistance (C_T), frictional resistance (Schoenherr, C_{FO}), wave resistance (C_w) and wave pattern resistance (C_{wp}) for three models of 6.0m, 4.0m and 2.5m length on the condition of free to sink and trim (FR). Wave resistance is derived using form factor on skin friction.

Wave pattern resistance is derived by the method of Newmwn-Sharma. Distance of measuring plane of wave profile from the center line of the model is as follows,

	IHI	SRI	UT	YNU
y/l	1.667	1.0	1.4	4.0

Figure 2 shows C_T , C_{FO} , C_w and C_{wp} for two models of 4.0m and 2.5m length on the condition of FX.

Figure 3 shows C_T , C_{FO} , C_w and C_{wp} for the 2.5m length model on the condition of FR, FX and S-FR, T-FX .

Figure 4 shows the sinkage and trim of three models of 6.0m, 4.0m and 2.5m length.

Figure 5 shows C_T , C_{FO} , C_w and C_{wp} of the 2.0m length model on the condition of FR and FX.

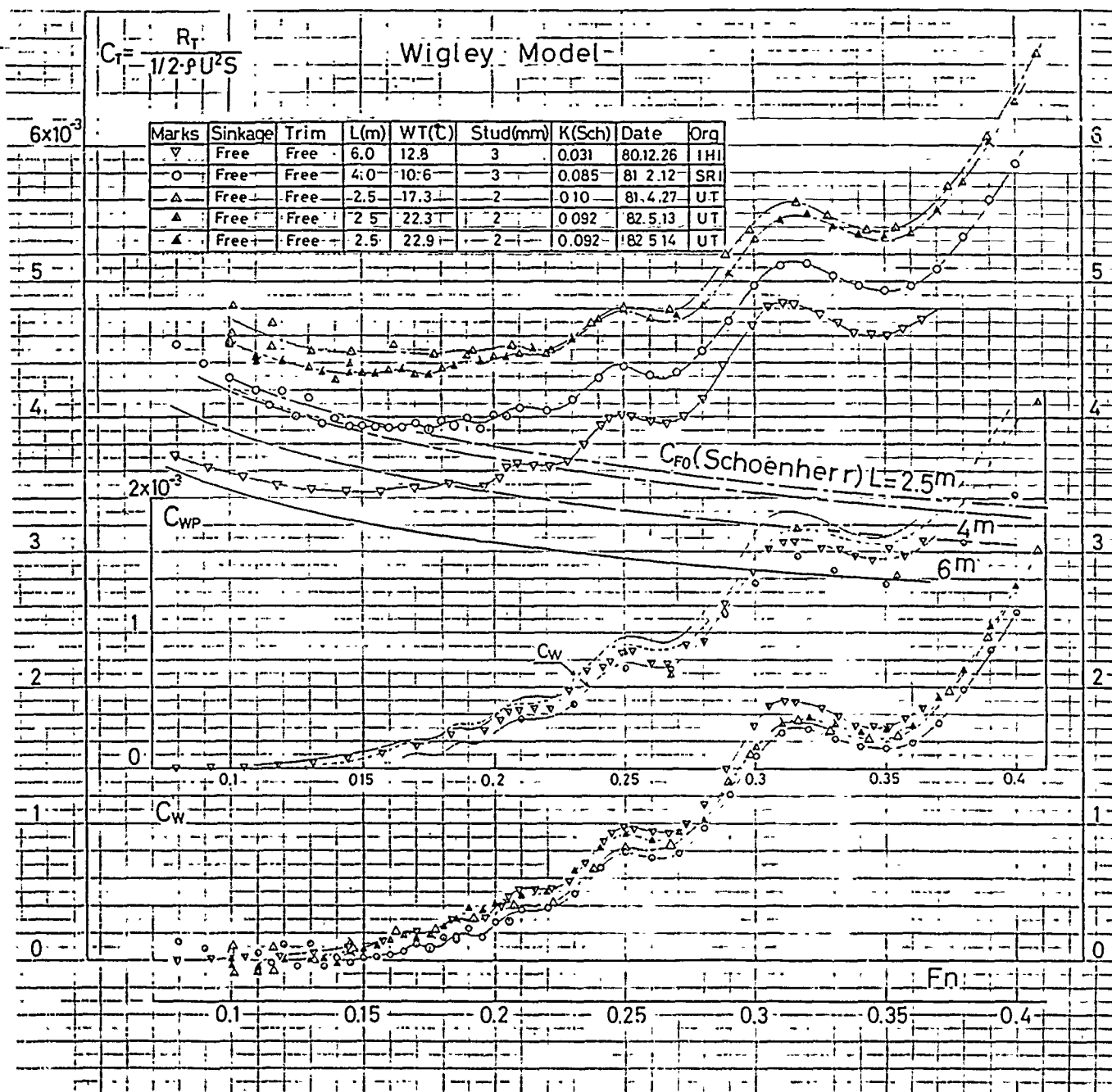


Fig.1 The results of resistance test and wave pattern analysis
(Free to sink and trim)

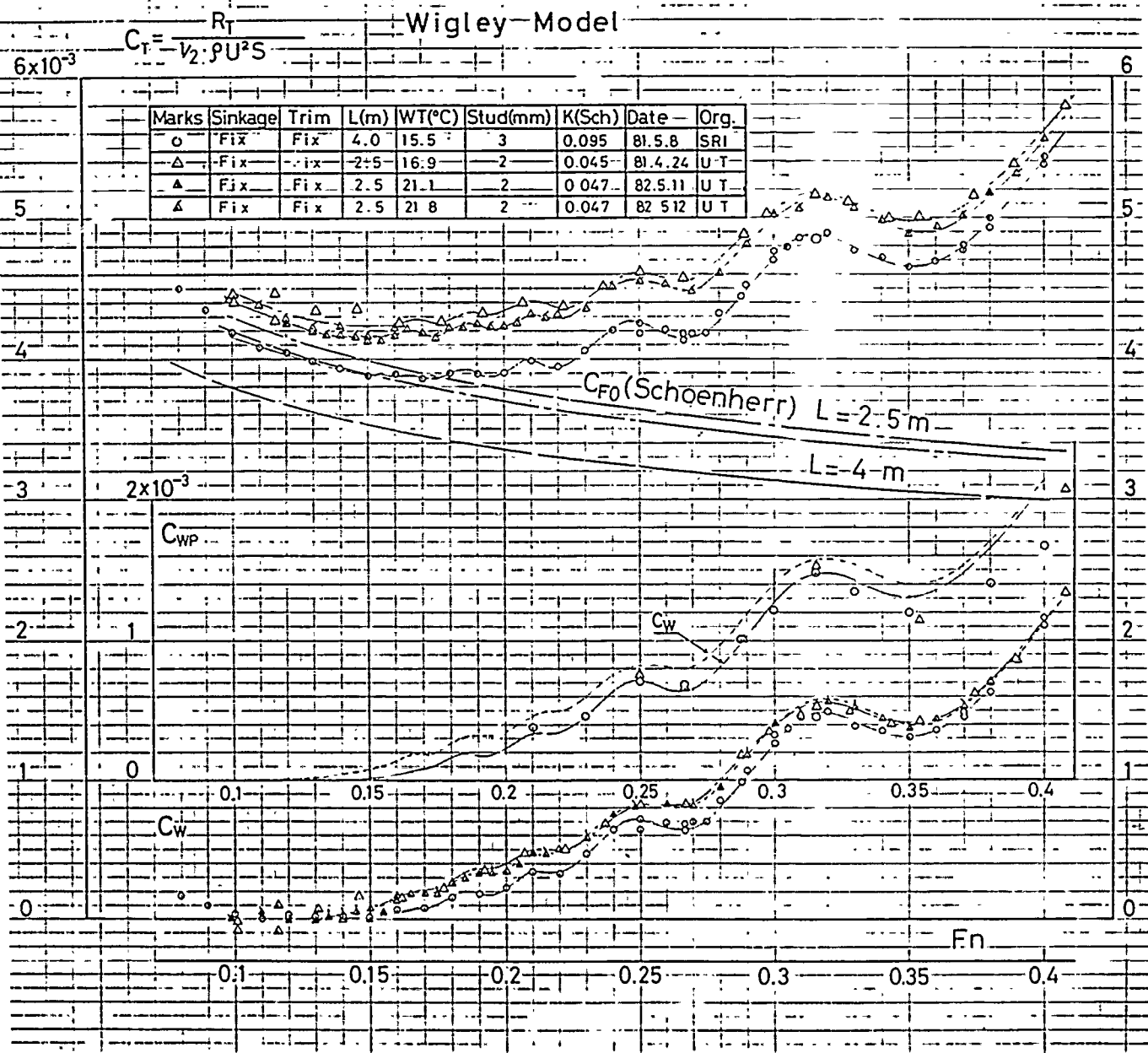


Fig.2 The results of resistance test and wave pattern analysis
(Fixed to sink and trim)

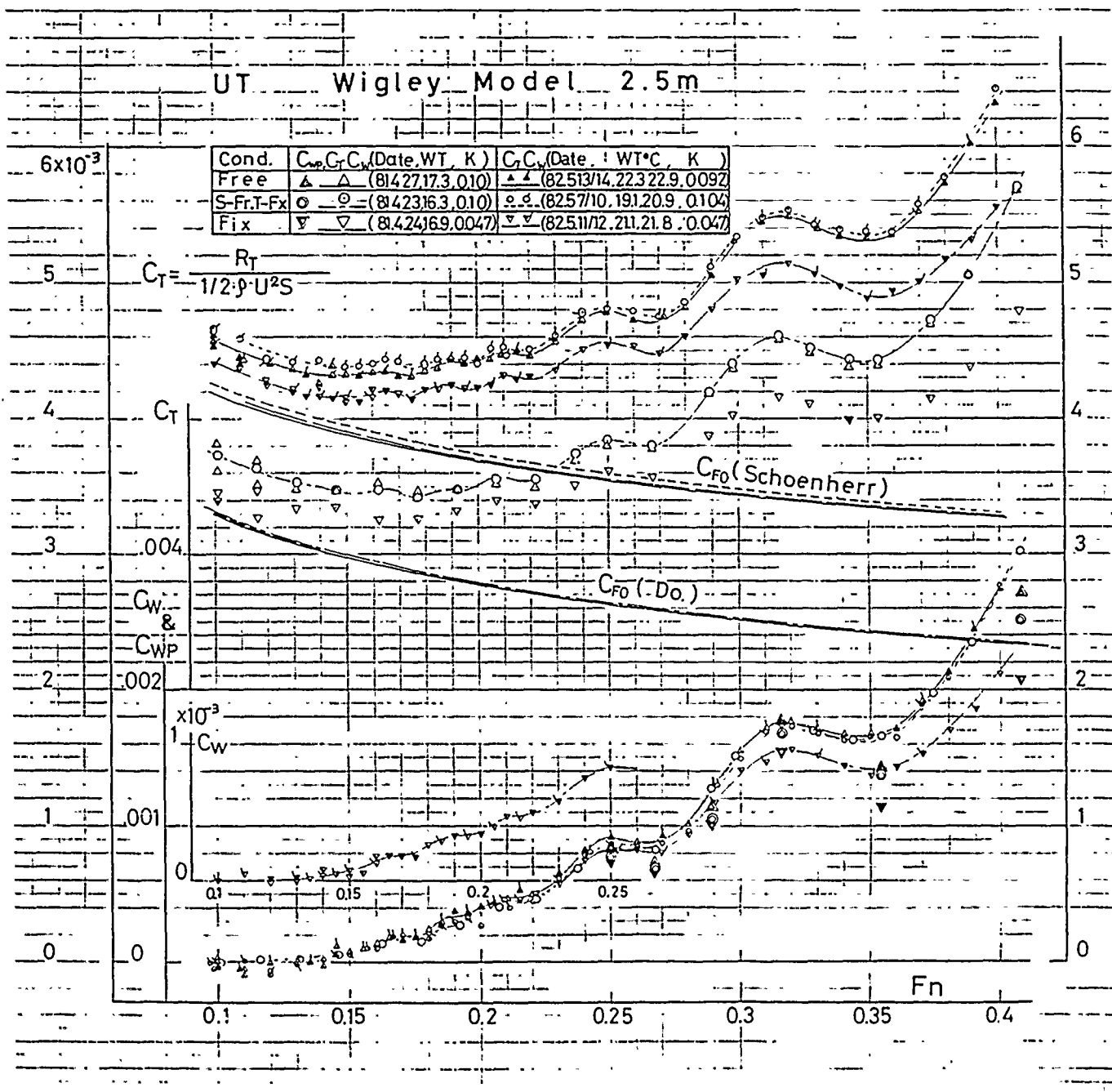


Fig.3 The results of resistance test and wave pattern analysis of 2.5m model

Wigley Model

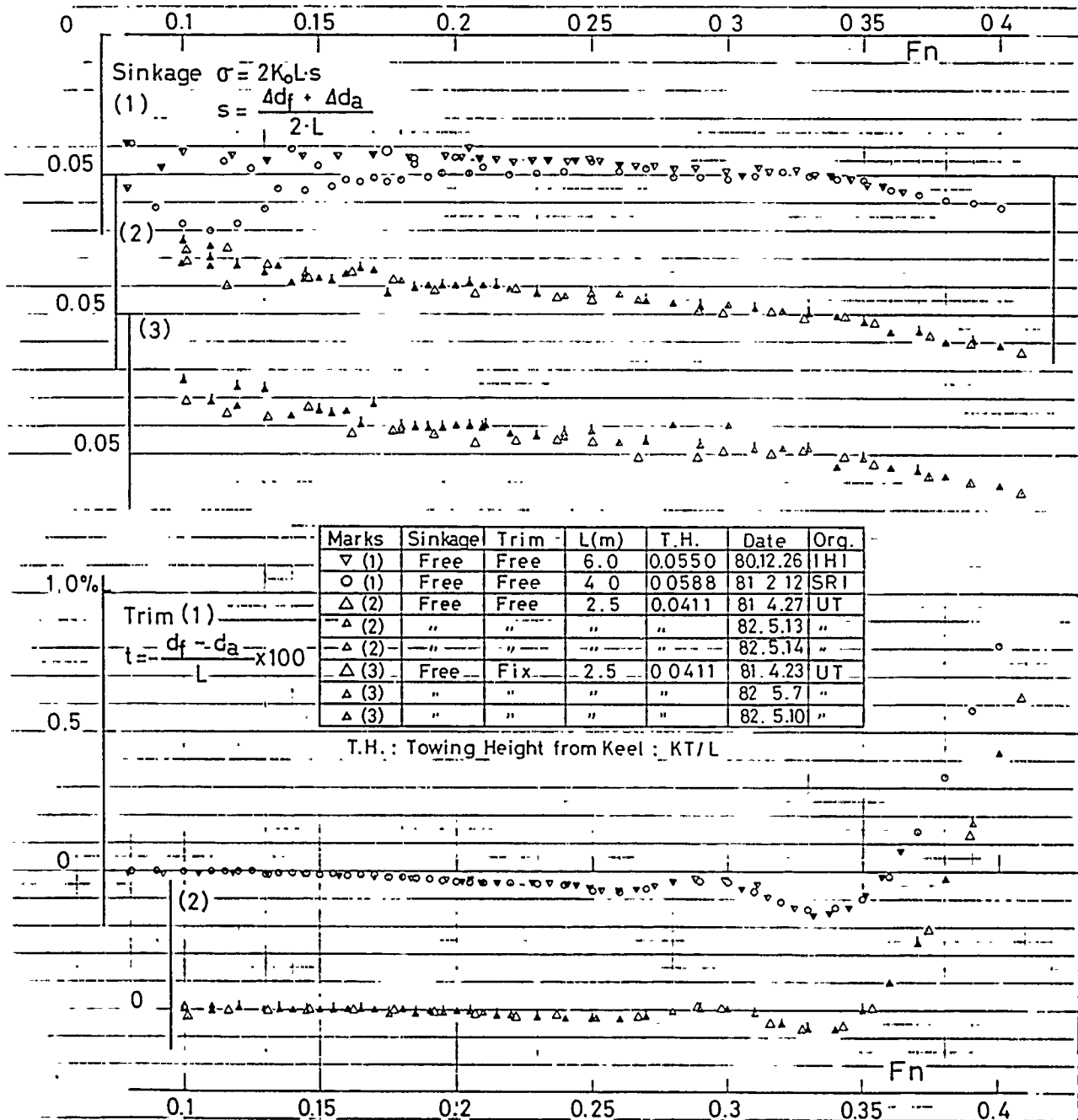


Fig.4 The results of sinkage and trim measurement

WIGLEY MODEL $L=2.0\text{ m}$ (YOKOHAMA NATIONAL UNIV.)

MARK	SINKAGE	TRIM	W.T.	k
—○—	FREE	FREE	13.3°C	0.06
—●—	FIXED	FIXED	13.3°C	0.06

$\times 10^{-3}$

C_T

C_{F0}

C_{F0} (Schoenherr)

C_w —○—
 C_{wp} —△—
 FREE TO SINK & TRIM

0

0.1

0.2

0.3

0.4 F_n

Fig.5 The results of resistance test and wave pattern analysis of 2.0m model

3. Results of wake survey

Condition of wake survey

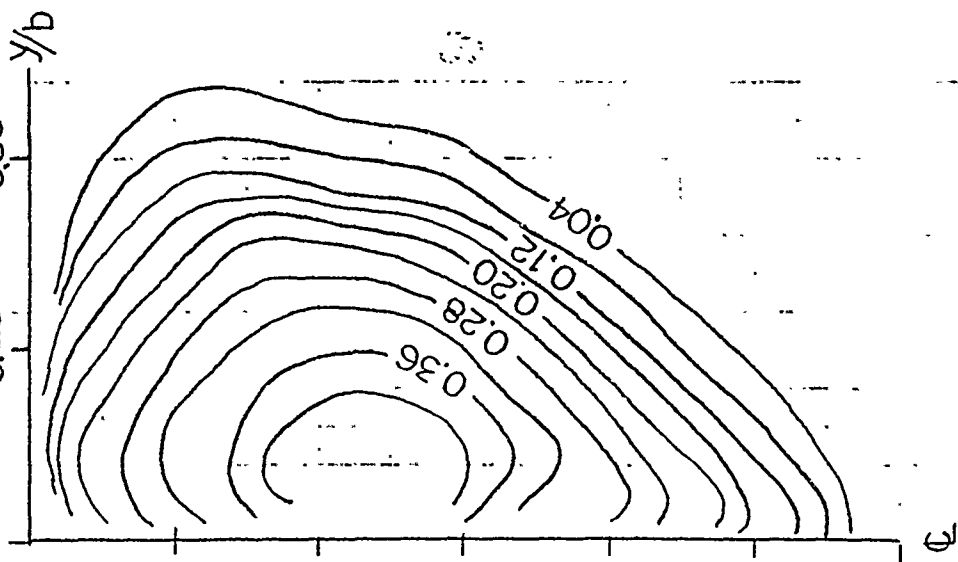
	IHI	SRI	UT	YNU
Position of measuring section from AP (x/l)	1.0	1.0	1.0	1.0

	Froude number					Water Temp(°C)
IHI (FR)	0.267			0.316		16.6
SRI (FR)	0.250	0.267	0.289	0.316		10.6
UT (FR)	0.250	0.267	0.289	0.316		20.9
YNU (FR)	0.230	0.276	0.309	0.343	0.377	

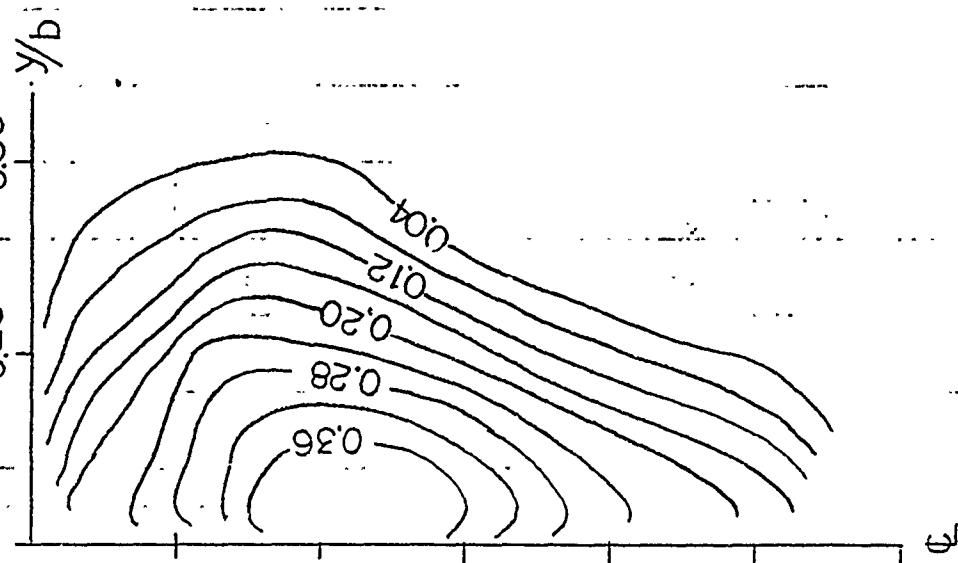
Figure 6 shows an example of the contour of nondimensional total head loss $(H - H_0)/H$ for three models of 6.0m, 4.0m and 2.5m length on the condition of FR.

Figure 7 shows an example of comparison of horizontally integrated total head loss for three models of 6.0m, 4.0m and 2.5m length.

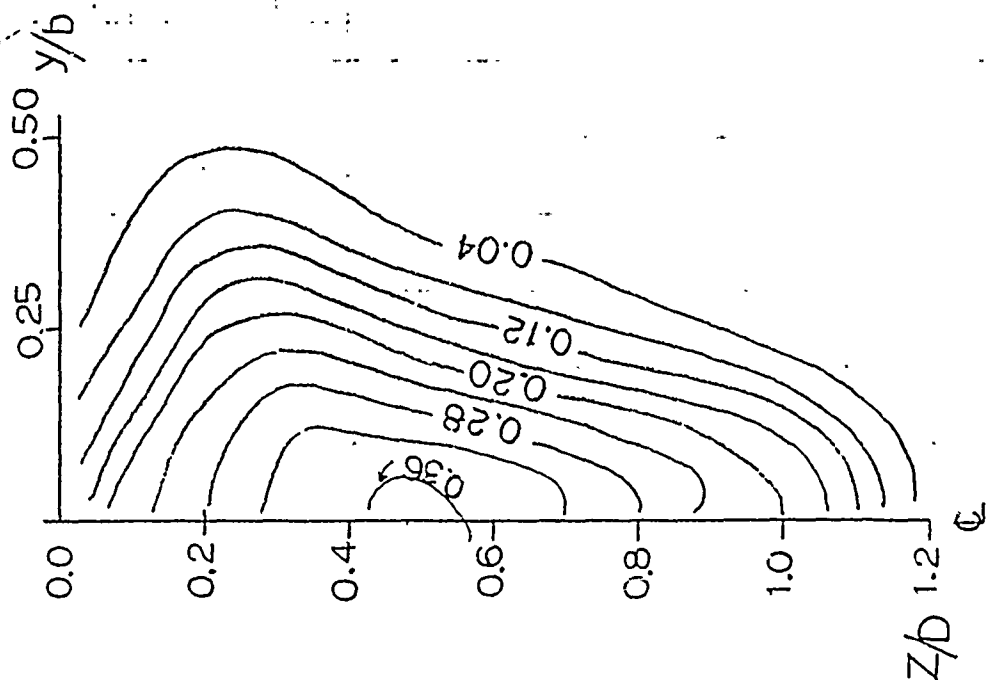
$L=2.5$



$L=4.0 \text{ m}$



$L=6.0 \text{ m}$



FREE $F_n = 0.316$

Fig.6 The contour of total head loss $(H_o - H)/H_o$

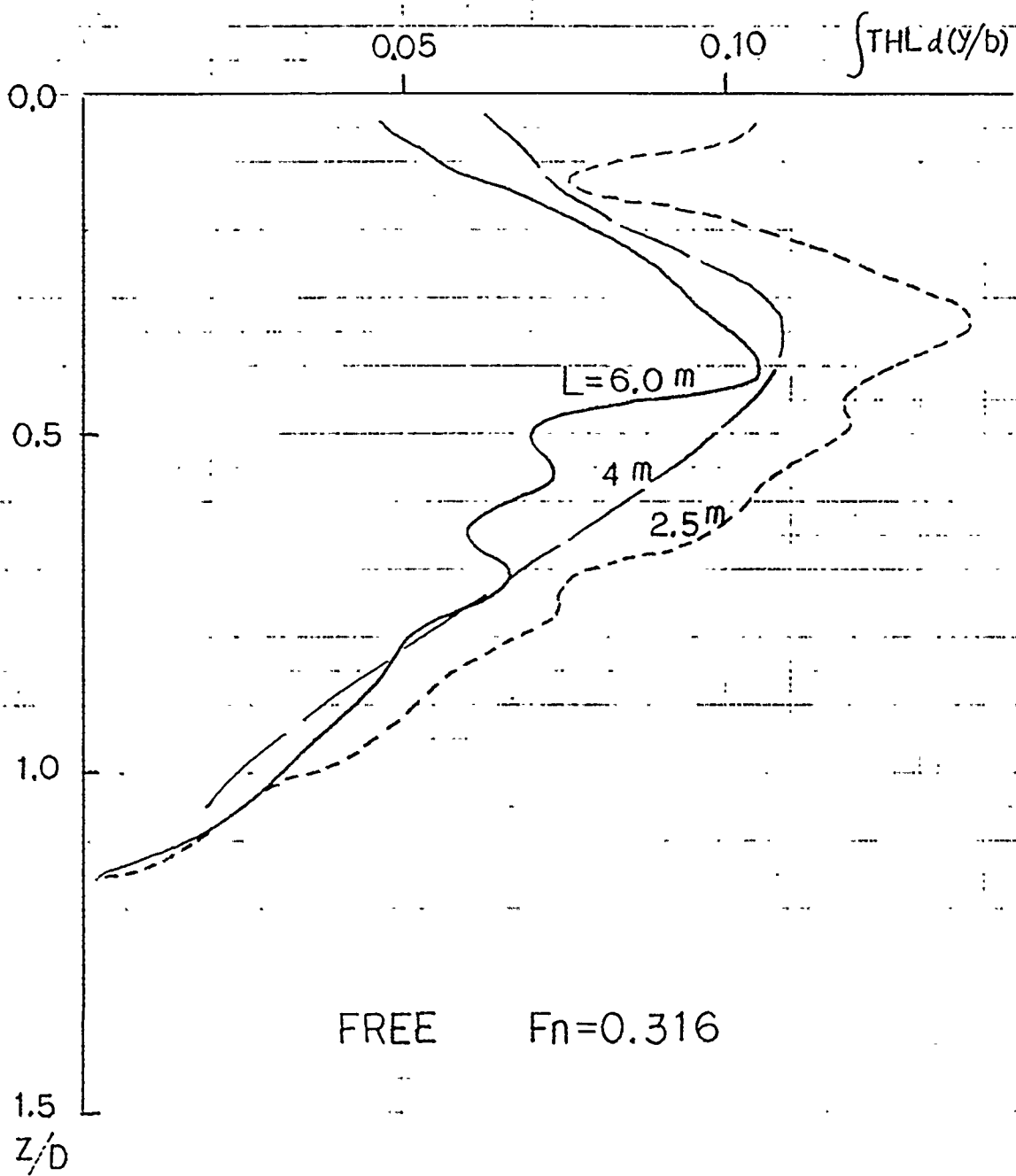


Fig.7 The comparison of horizontally integrated total head loss

4. Results of wave profile measurement on the hull

Condition of measurements

	Froude number						
IHI (FR)	0.250	0.267	0.289	0.316			
SRI (FR)	0.250	0.267	0.289	0.316			
SRI (FX)	0.250	0.267	0.289	0.316			
UT (FR)	0.250	0.267	0.287	0.316	0.354	0.408	
UT (FX)	0.250	0.267	0.289	0.316	0.354	0.408	
UT(S-FR.T-FX)	0.250	0.267	0.289	0.316	0.354	0.408	

Figure 8 shows the comarison of wave profile on the hull on the condition of FR, where ξ is nondimensional wave elevation ($= g\xi(x)/U^2$)

Table 1 gives nondimensional wave elevation for three models of 6.0m ,4.0m and 2.5m length.

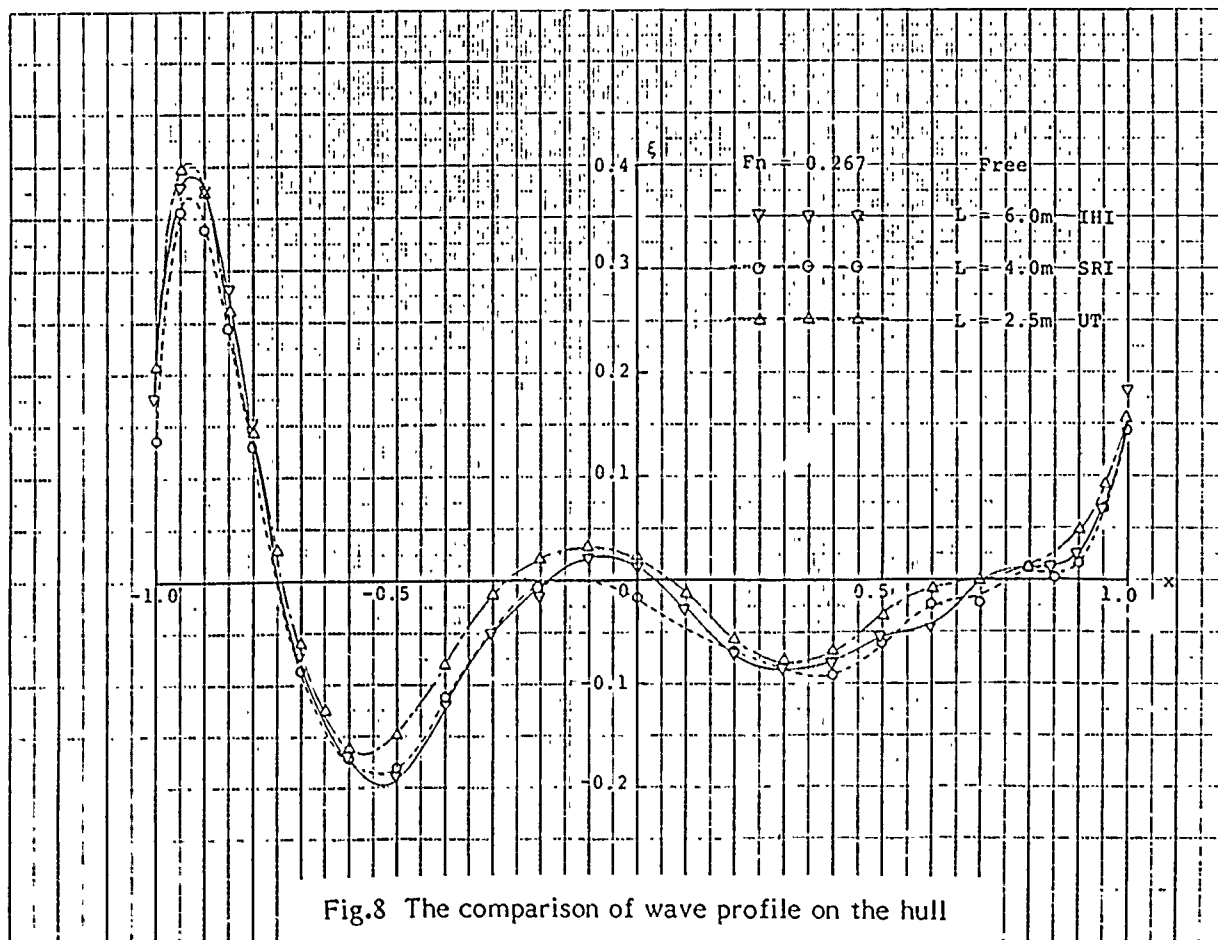
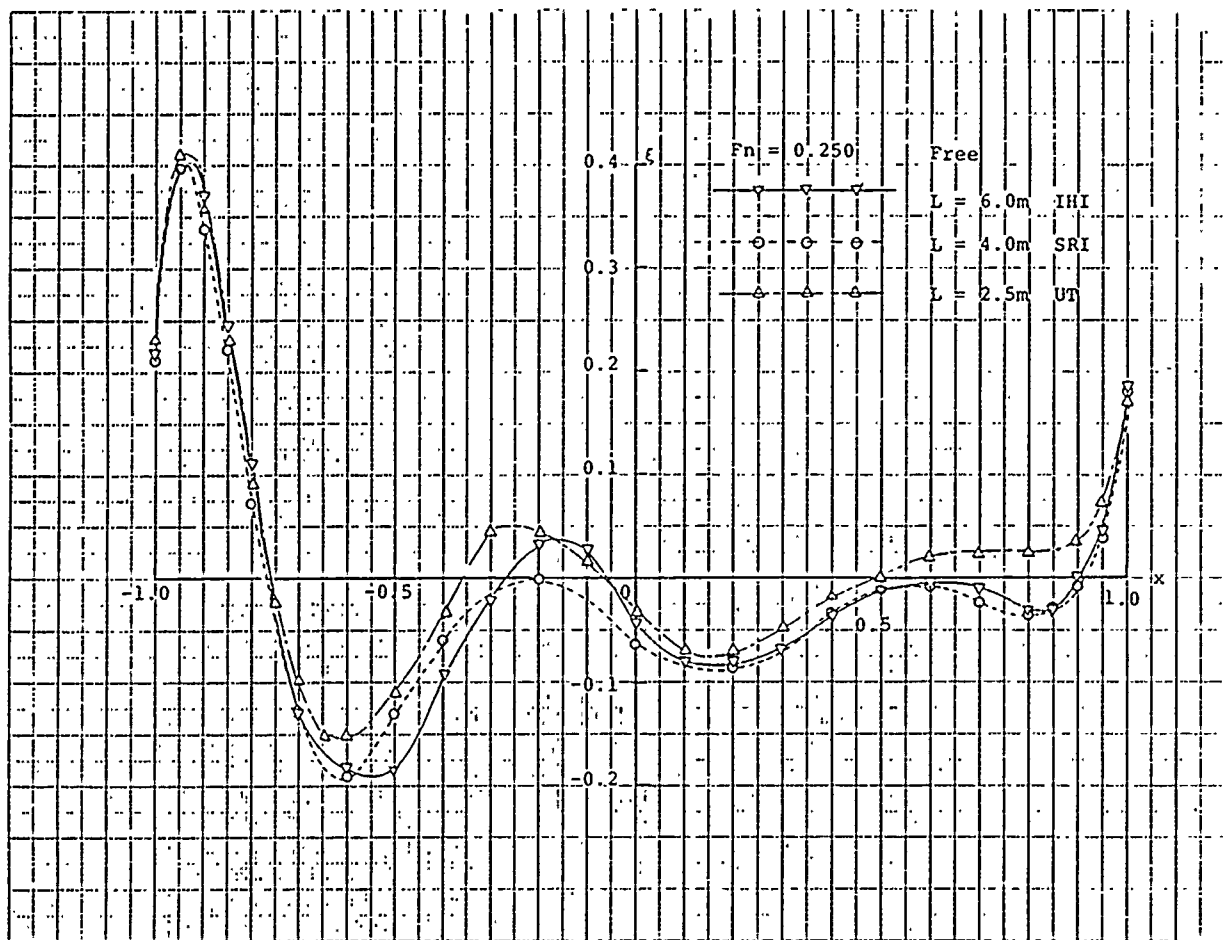


Fig.8 The comparison of wave profile on the hull

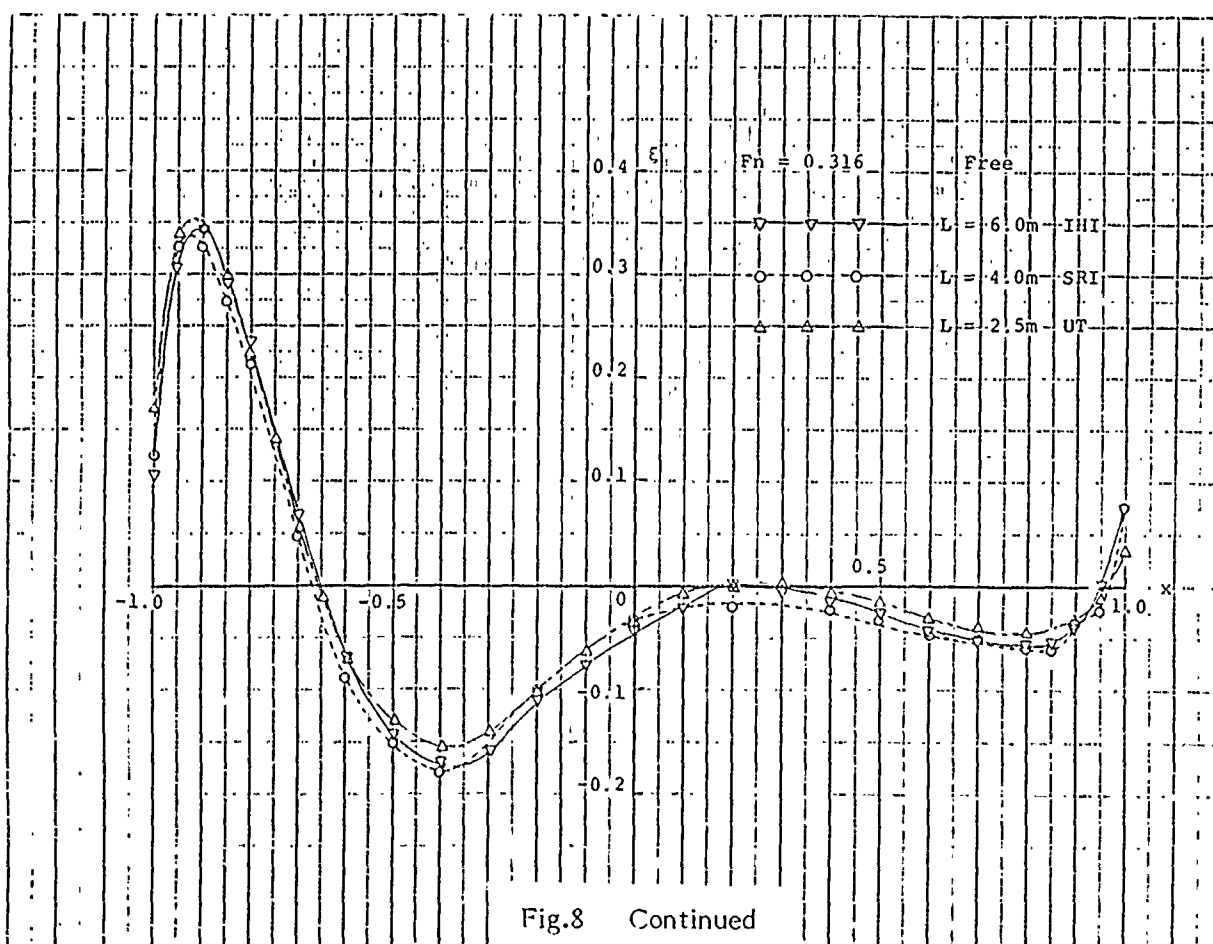
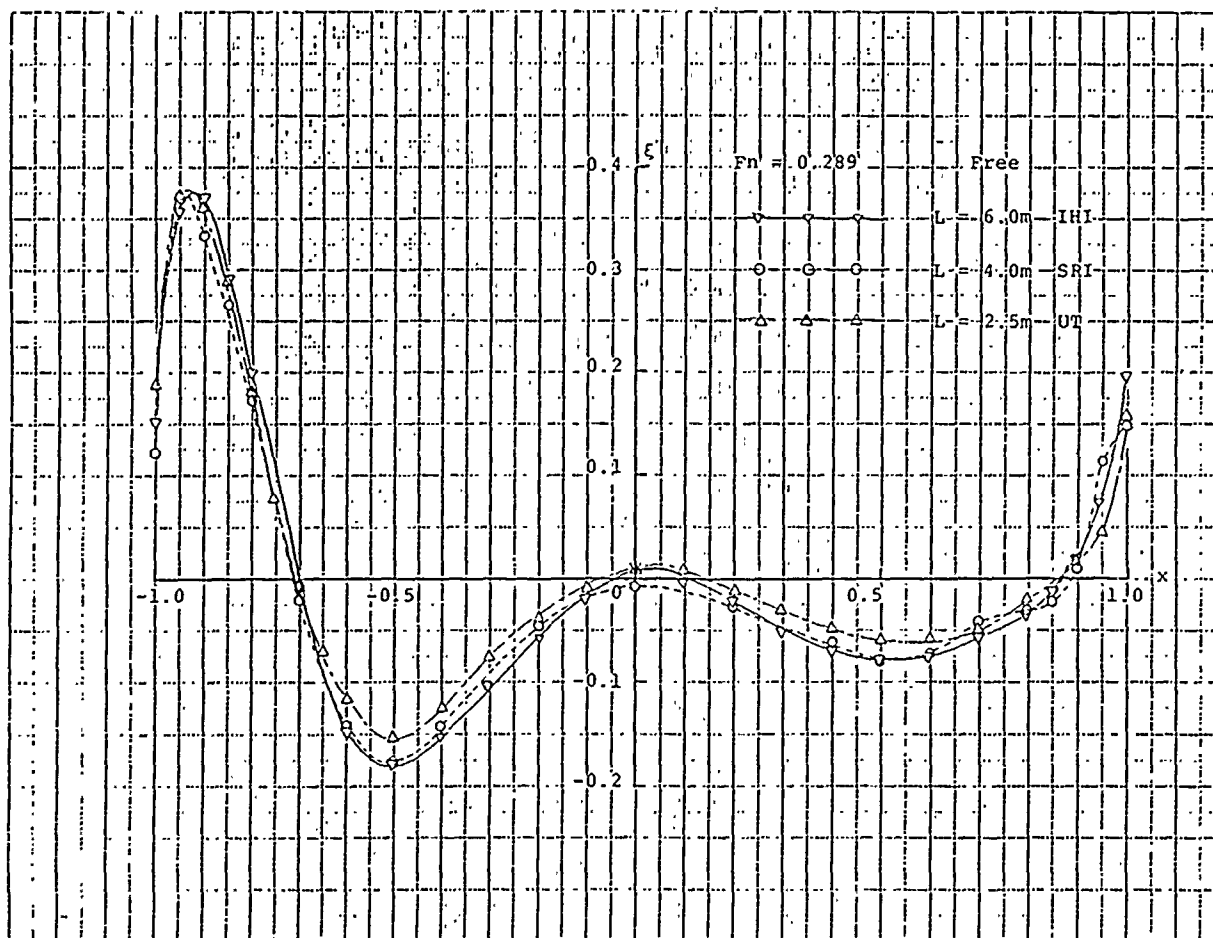


Fig.8 Continued

Table 1 The nondimensional wave elevation on the hull

2X/L	gζ/U ² Free L=6.0m (IHI)			
	FN= .250	FN= .267	FN= .289	FN= .316
-1.000	.177	.218	.149	.109
-.950	.378	.400	.354	.306
-.900	.374	.373	.370	.343
-.850	.281	.246	.290	.294
-.800	.151	.113	.198	.237
-.700	-.077	-.131	-.010	.068
-.600	-.174	-.183	-.149	-.071
-.500	-.191	-.134	-.181	-.147
-.400	-.120	-.091	-.157	-.169
-.300	-.050	-.021	-.108	-.162
-.200	-.016	.034	-.056	-.111
-.100	.022	.024	-.020	-.080
.000	.014	.044	.012	-.045
.100	-.027	-.081	-.003	-.021
.200	-.073	-.079	-.023	.003
.300	-.086	-.068	-.050	-.003
.400	-.080	-.035	-.070	-.015
.500	-.056	-.013	-.078	-.027
.600	-.046	-.004	-.078	-.043
.700	-.003	-.011	-.057	-.062
.800	.012	-.031	-.037	-.068
.850	.013	-.031	-.013	-.054
.900	.027	.002	.019	-.041
.950	.070	.045	.072	.007
1.000	.187	.184	.196	.077

2X/L	gζ/U ² Free L=4.0m (SRI)			
	FN= .250	FN= .267	FN= .289	FN= .316
-1.000	.213	.137	.121	.120
-.950	.397	.355	.370	.327
-.900	.338	.340	.333	.325
-.850	.223	.246	.266	.275
-.800	.074	.130	.173	.212
-.700	-.127	-.085	-.021	.047
-.600	-.192	-.172	-.141	-.090
-.500	-.132	-.181	-.176	-.151
-.400	-.050	-.113	-.142	-.179
-.300	-.003	-.008	-.045	-.103
-.200	-.064	-.017	-.038	-.032
-.100	-.087	-.069	-.028	-.020
.000	-.034	-.094	-.051	-.023
.100	-.011	-.051	-.035	-.033
.200	-.023	-.023	-.074	-.049
.300	-.035	.013	-.030	-.050
.400	-.029	.003	-.022	-.062
.500	-.009	.015	.011	-.035
.600	.037	.070	.113	-.023
.700	.120	.143	.149	.076

2X/L	gζ/U ² Fixed L=4.0m (SRI)			
	FN= .250	FN= .267	FN= .289	FN= .316
-1.000	.192	.175	.186	.155
-.950	.440	.392	.408	.340
-.900	.368	.329	.324	.330
-.850	.248	.252	.258	.275
-.800	.104	.133	.192	.205
-.700	-.136	-.070	-.026	.046
-.600	-.160	-.168	-.132	-.075
-.500	-.120	-.178	-.168	-.140
-.400	-.032	-.112	-.144	-.195
-.300	-.016	.000	-.048	-.100
-.200	-.056	-.007	-.012	-.030
-.100	-.050	-.070	-.024	-.005
.000	-.038	-.070	-.072	-.015
.100	-.072	-.063	-.084	-.035
.200	-.048	-.049	-.084	-.046
.300	.008	.014	-.054	-.060
.400	.016	.007	-.042	-.060
.500	.016	.007	-.024	-.060
.600	.024	.007	.006	-.046
.700	.060	.042	.084	-.030
.800	.224	.154	.162	-.075

Table 1 Continued

2X/L	$g\zeta/U^2$ Free L=2.5 m (UT)					
	FN= .250	FN= .267	FN= .289	FN= .316	FN= .354	FN= .408
-1.000	.232	.208	.192	.170	.133	.091
-.950	.410	.399	.374	.338	.267	.232
-.900	.360	.377	.365	.346	.324	.282
-.850	.232	.265	.288	.298	.299	.274
-.800	.091	.142	.182	.227	.241	.237
-.750	-.024	.030	.077	.139	.184	.228
-.700	-.100	-.059	.000	.059	.120	.158
-.650	-.151	-.126	-.068	-.013	.062	.107
-.600	-.151	-.160	-.116	-.068	.004	.061
-.500	-.112	-.148	-.154	-.132	-.085	-.018
-.400	-.035	-.081	-.125	-.155	-.130	-.067
-.300	-.043	-.013	-.077	-.136	-.137	-.098
-.200	-.043	.021	-.039	-.107	-.130	-.123
-.100	-.218	.032	-.011	-.066	-.117	-.120
.000	-.032	.022	.009	-.034	-.098	-.126
.100	-.070	-.012	.009	-.009	-.073	-.119
.200	-.070	-.056	-.011	-.001	-.047	-.110
.300	-.044	-.078	-.030	.000	-.028	-.096
.400	-.017	-.067	-.049	-.008	-.015	-.080
.500	-.009	-.033	-.059	-.015	-.006	-.067
.600	-.022	-.010	-.059	-.031	-.002	-.059
.700	-.023	.002	-.050	-.038	-.002	-.056
.800	-.023	.013	-.021	-.046	-.009	-.048
.900	-.037	.047	.021	-.029	-.015	-.026
.950	.075	.092	.046	-.013	.010	.000
1.000	.178	.160	.161	.036	.029	.020

2X/L	$g\zeta/U^2$ Fixed L=2.5 m (UT)					
	FN= .250	FN= .267	FN= .289	FN= .316	FN= .354	FN= .408
-1.000	.307	.246	.192	.160	.128	.086
-.950	.397	.358	.326	.312	.256	.236
-.900	.346	.336	.346	.328	.307	.288
-.850	.218	.224	.259	.264	.269	.274
-.800	.077	.101	.163	.152	.218	.230
-.750	-.064	-.011	.058	.104	.154	.187
-.700	-.141	-.090	-.019	.024	.090	.139
-.650	-.179	-.146	-.086	-.032	.032	.086
-.600	-.179	-.168	-.134	-.088	-.026	.043
-.500	-.128	-.157	-.163	-.144	-.102	-.029
-.400	-.051	-.112	-.144	-.160	-.141	-.086
-.300	.026	-.046	-.096	-.136	-.141	-.106
-.200	.013	-.011	-.058	-.104	-.134	-.115
-.100	-.026	.000	-.019	-.072	-.115	-.120
.000	-.077	-.022	-.010	-.048	-.096	-.120
.100	-.102	-.056	-.010	-.028	-.077	-.110
.200	-.090	-.078	-.029	-.016	-.058	-.096
.300	-.064	-.090	-.048	-.012	-.038	-.082
.400	-.026	-.078	-.058	-.016	-.026	-.072
.500	-.013	-.056	-.067	-.032	-.013	-.062
.600	.000	-.034	-.058	-.048	-.013	-.050
.700	-.013	-.011	-.048	-.056	-.019	-.043
.800	-.013	.000	-.019	-.064	-.026	-.029
.900	.000	.011	-.019	-.040	-.013	-.014
.950	.026	.056	.048	-.016	.000	-.006
1.000	.141	.157	.125	.024	.038	.034

2X/L	$g\zeta/U^2$ FR-sink, FX-trim L=2.5 m (UT)					
	FN= .250	FN= .267	FN= .289	FN= .316	FN= .354	FN= .408
-1.000	.236	.206	.188	.174	.132	.088
-.950	.415	.396	.351	.342	.266	.231
-.900	.364	.374	.351	.350	.324	.289
-.850	.223	.251	.275	.286	.292	.289
-.800	.082	.128	.169	.206	.241	.264
-.750	-.033	.016	.063	.126	.177	.220
-.700	-.110	-.063	-.013	.046	.113	.167
-.650	-.174	-.141	-.081	-.026	.055	.114
-.600	-.174	-.163	-.138	-.074	-.009	.070
-.500	-.123	-.152	-.157	-.138	-.086	-.012
-.400	-.033	-.096	-.138	-.154	-.137	-.075
-.300	.031	-.029	-.090	-.138	-.137	-.115
-.200	.044	.016	-.042	-.106	-.131	-.126
-.100	.018	.027	.006	-.066	-.118	-.131
.000	-.046	.016	.015	-.034	-.105	-.125
.100	-.085	-.029	.015	-.010	-.079	-.118
.200	-.085	-.074	.006	-.002	-.054	-.109
.300	-.046	-.074	-.004	-.002	-.035	-.096
.400	-.020	-.063	-.013	-.010	-.015	-.077
.500	.006	-.040	-.033	-.018	-.003	-.059
.600	.031	-.018	-.039	-.034	-.003	-.046
.700	.031	.004	-.023	-.042	-.004	-.036
.800	.018	.016	-.004	-.042	-.003	-.027
.900	.031	.038	.025	-.034	.004	-.019
.950	.056	.072	.063	-.010	.017	.010
1.000	.184	.184	.159	.022	.055	.029

5. Results of pressure measurement on the hull surface

Condition of pressure measurements

	Froude number				
IHI (FR)	0.104	0.250	0.267	0.289	0.316
SRI (FR)		0.250	0.267	0.289	0.316
UT (FR)		0.250	0.267	0.289	0.316
UT (FX)		0.250	0.267	0.289	0.316

Pressure resistance coefficient

$$C_{PR} = R_p / \left(\frac{1}{2} \rho U^2 S \right)$$

Fn	IHI	SRI	UT	
	FR	FR	FR	FX
0.250	0.891×10^{-3}	1.150×10^{-3}	0.878×10^{-3}	0.941 10
0.267	0.916	0.979	0.920	0.827
0.289	1.280	1.374	1.318	1.221
0.316	1.803	1.998	1.866	1.786

Figures 9 through 11 show examples of the pressure distributions on the hull surface projected on the midship section for three models of 6.0m, 4.0m and 2.5m length on the condition of FR.

Figure 12 shows the comparison of horizontally integrated pressure for three models of 6.0m, 4.0m, and 2.5m length on the condition of FR.

Tables 2 through 5 give the pressure coefficient on the hull surface.

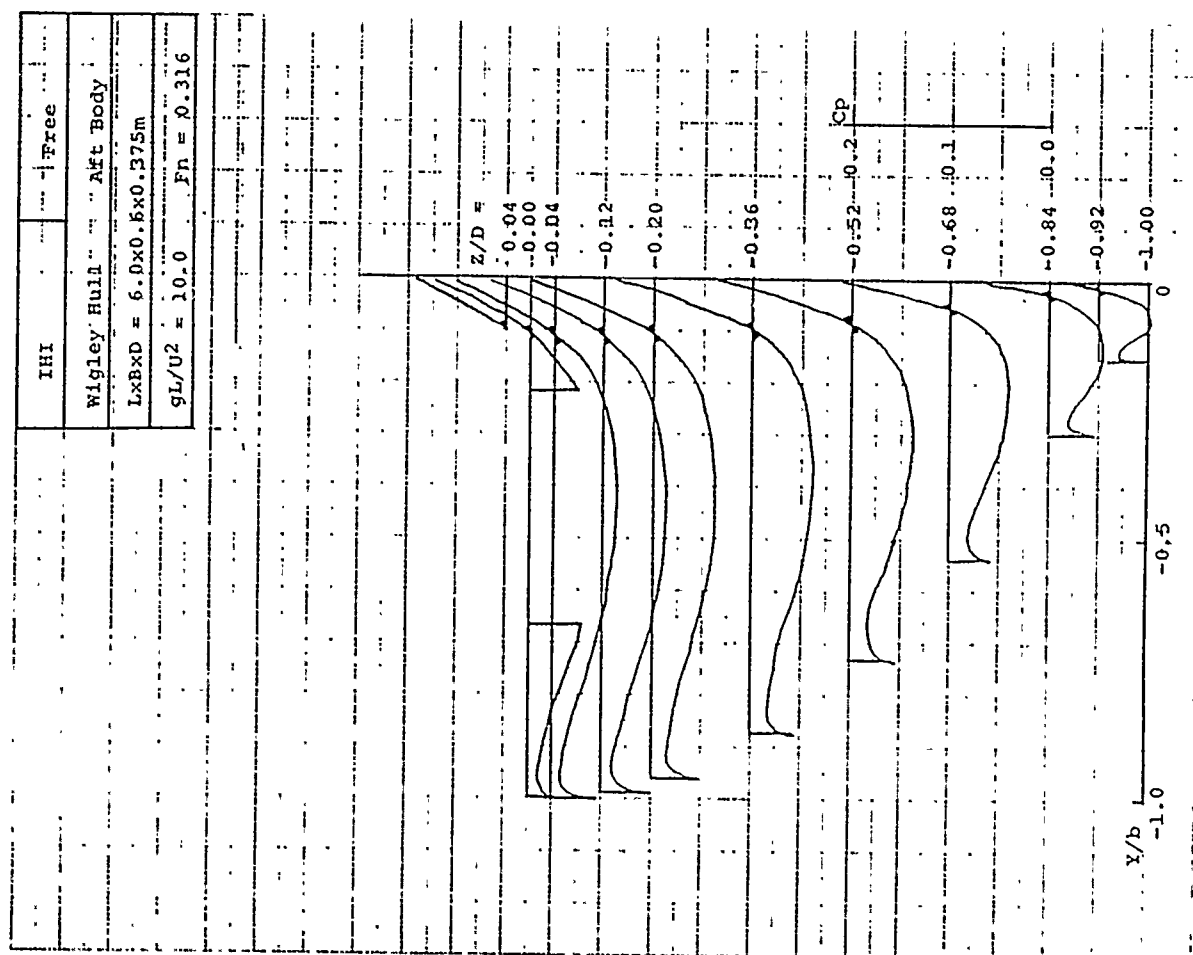
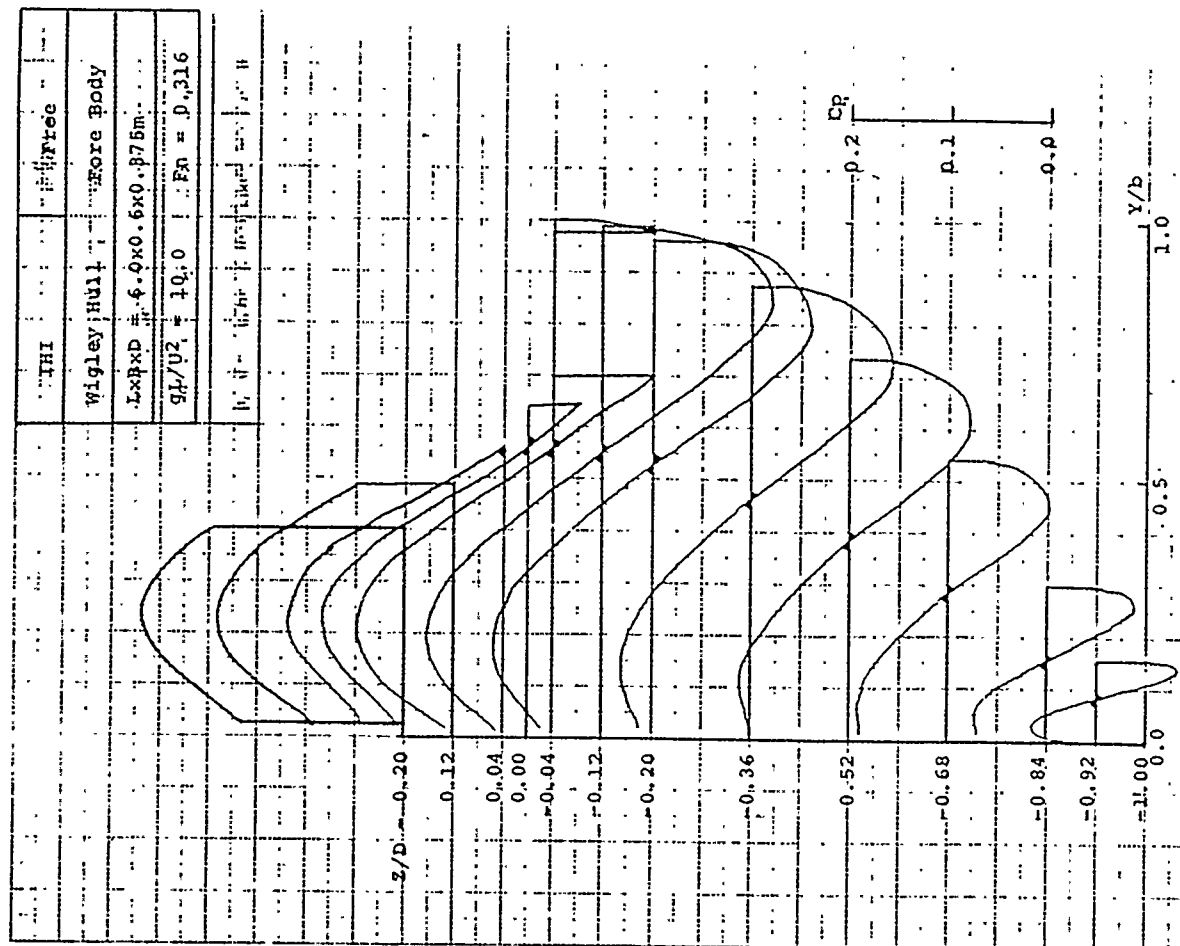
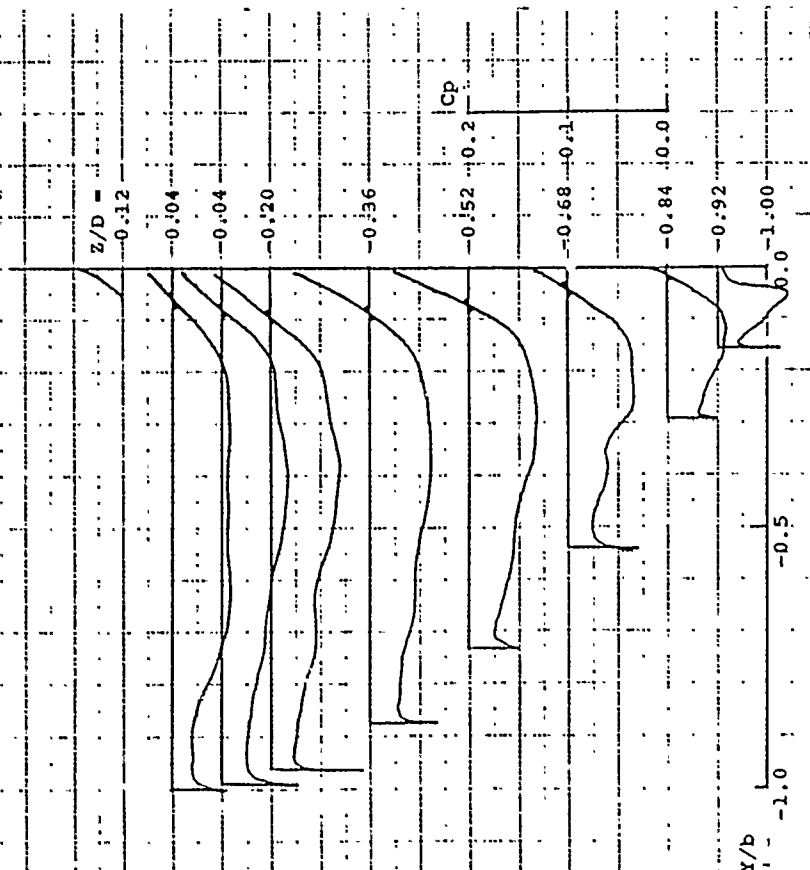


Fig.9 The pressure distribution on the hull of 6.0m model



SRI	Free
Wigley Hull	Aft Body
$L \times B \times D = 4.0 \times 0.4 \times 0.25 \text{ m}$	
$gU/U^2 = 10.0$	$F_n = 0.316$



SRI	Free
Wigley Hull	Fore Body
$L \times B \times D = 4.0 \times 0.4 \times 0.25 \text{ m}$	
$gU/U^2 = 10.0$	$F_n = 0.316$

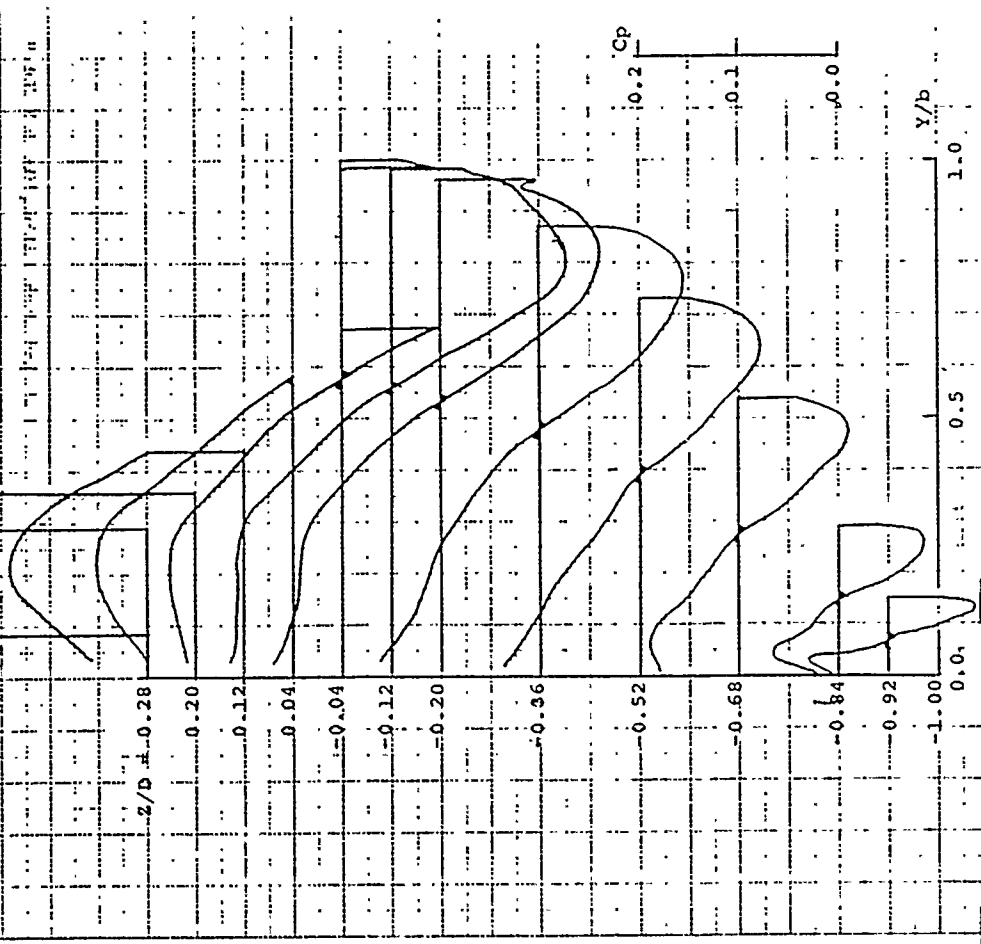


Fig.10 The pressure distribution on the hull of 4.0m model

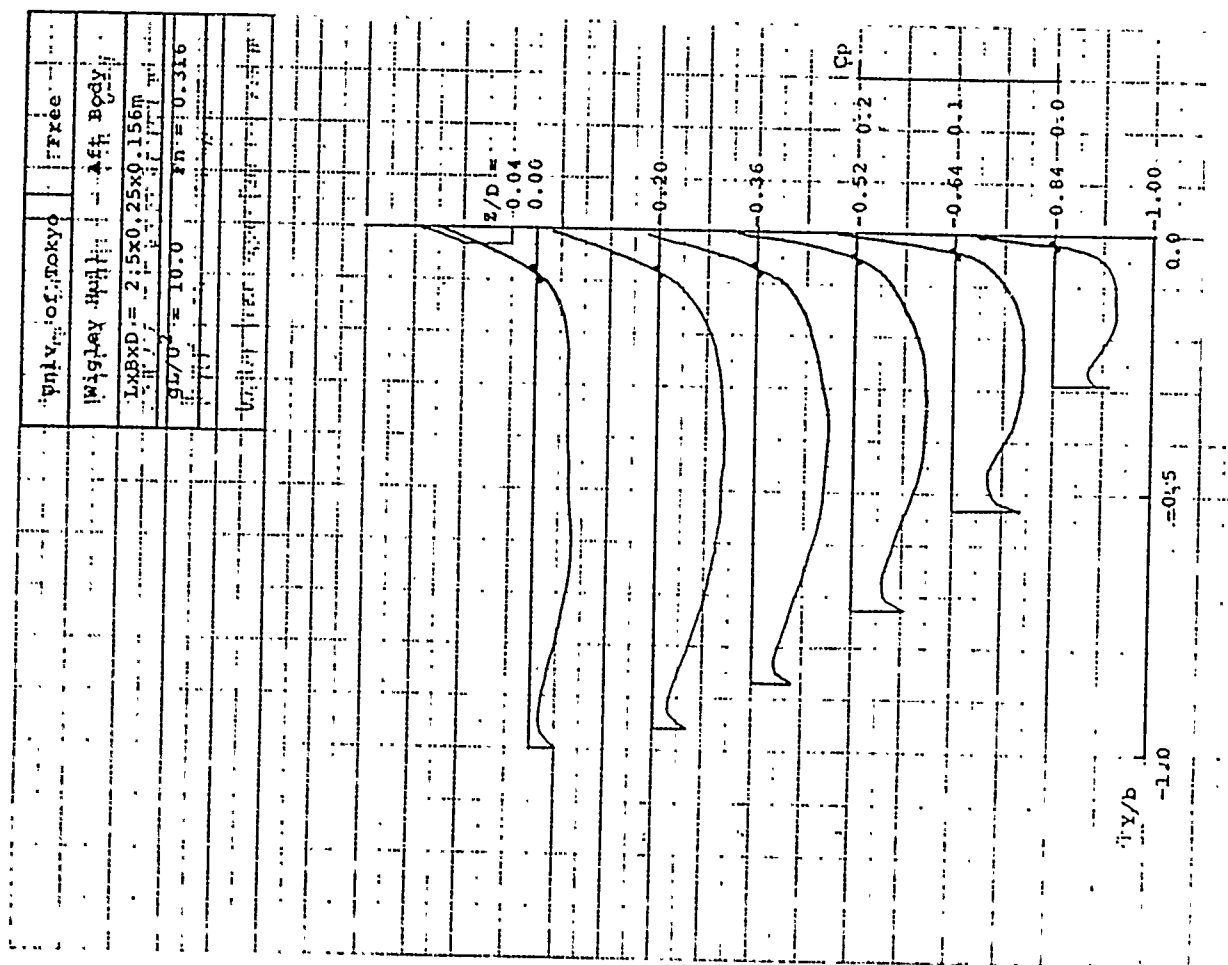
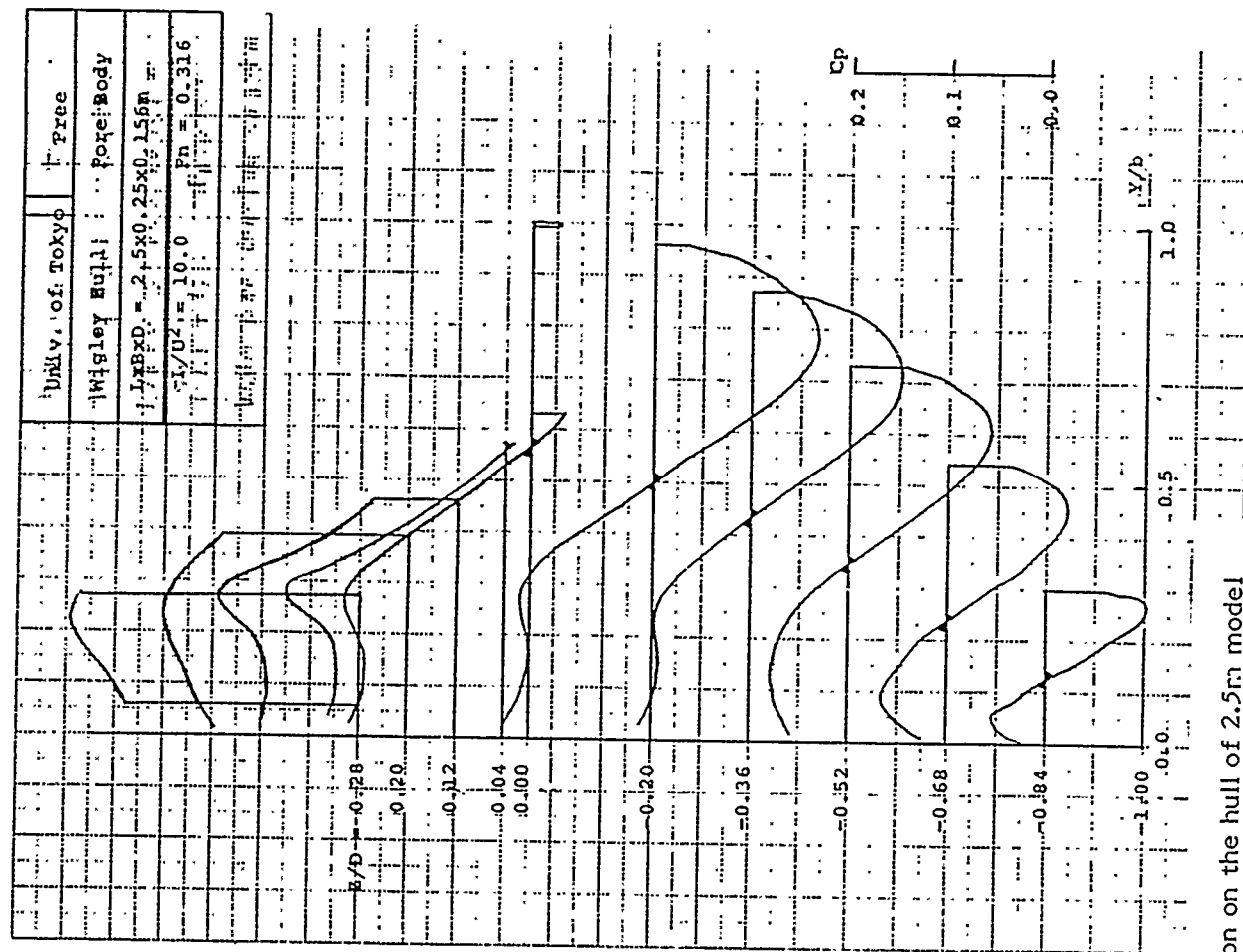


Fig.11 The pressure distribution on the hull of 2.5m model



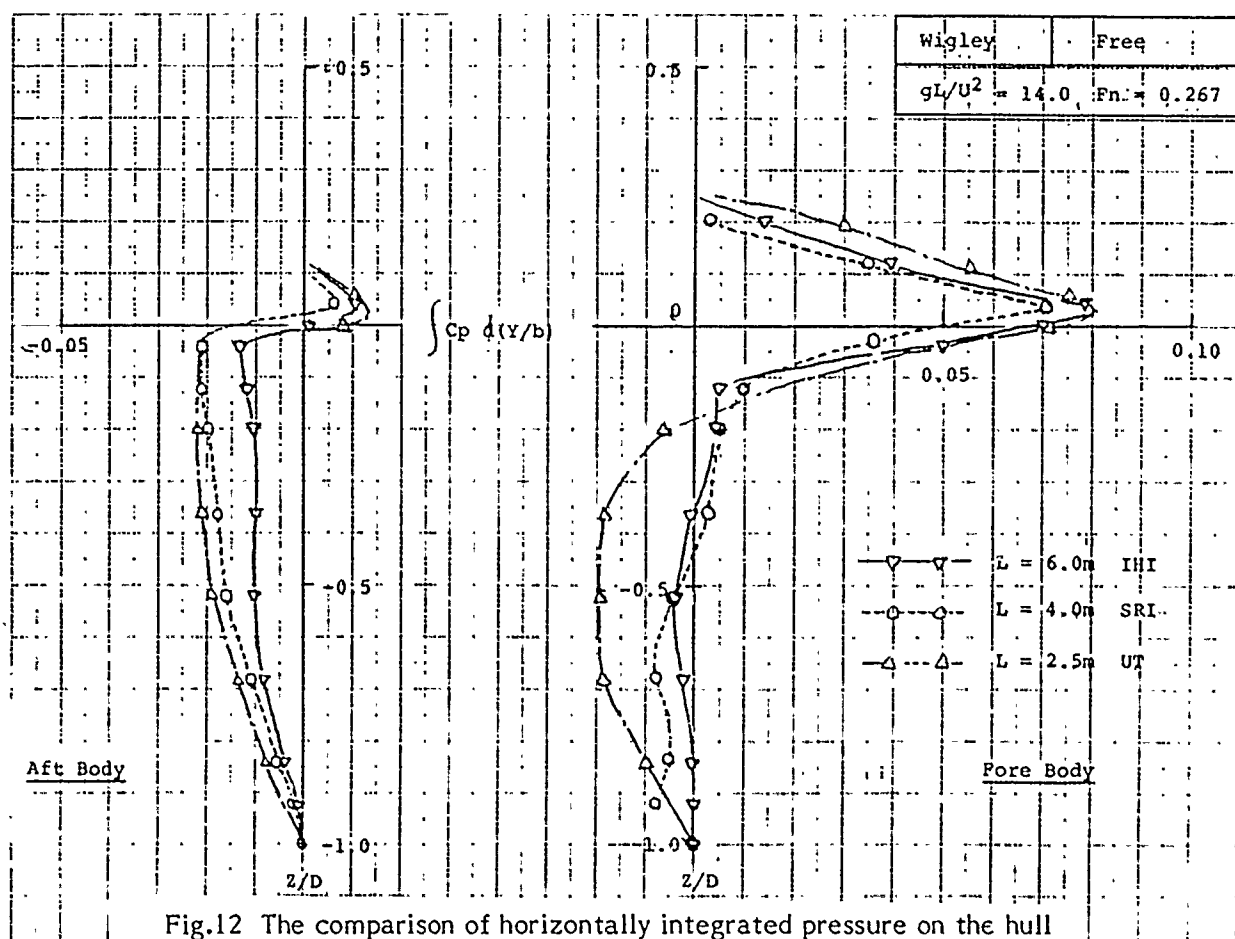
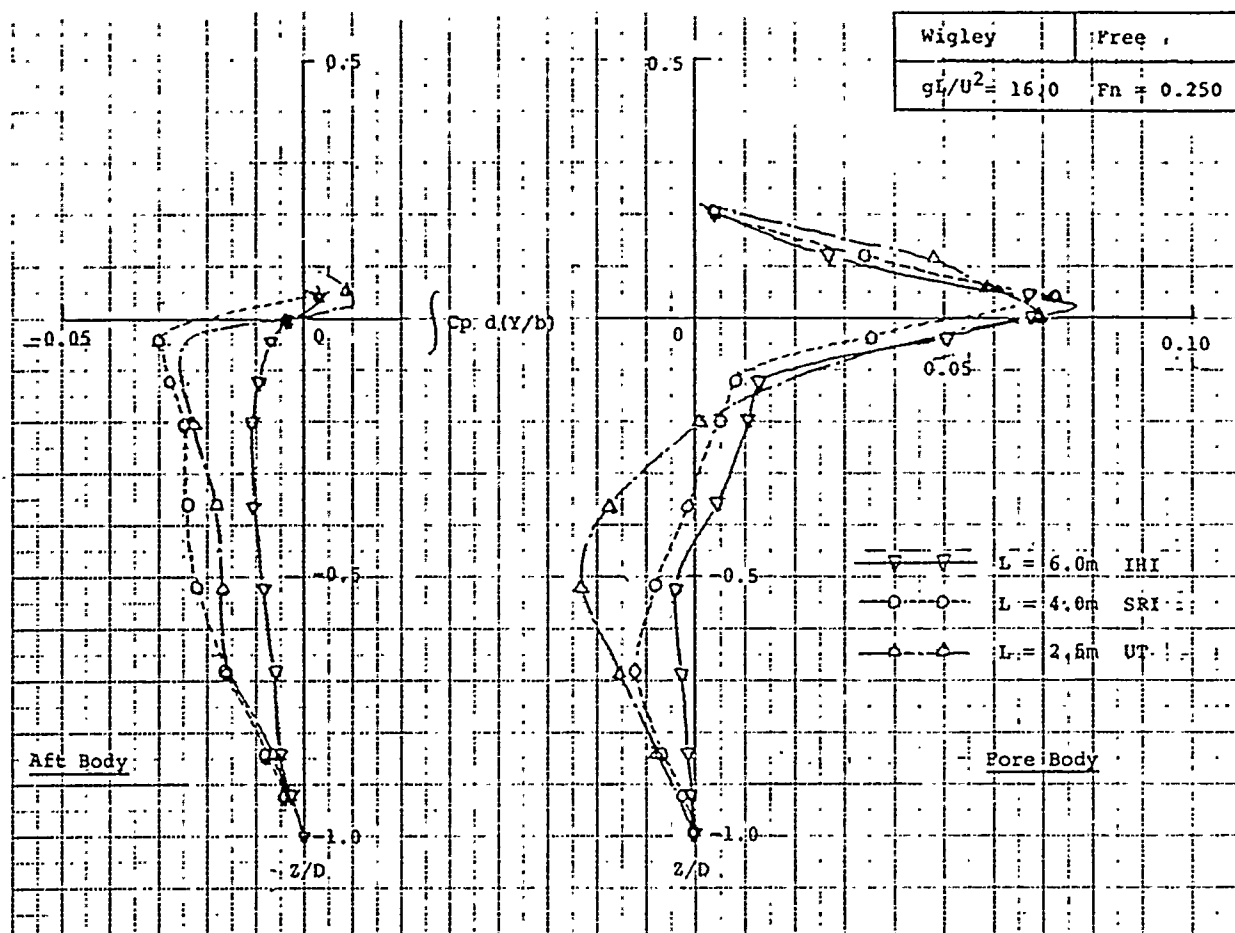


Fig.12 The comparison of horizontally integrated pressure on the hull

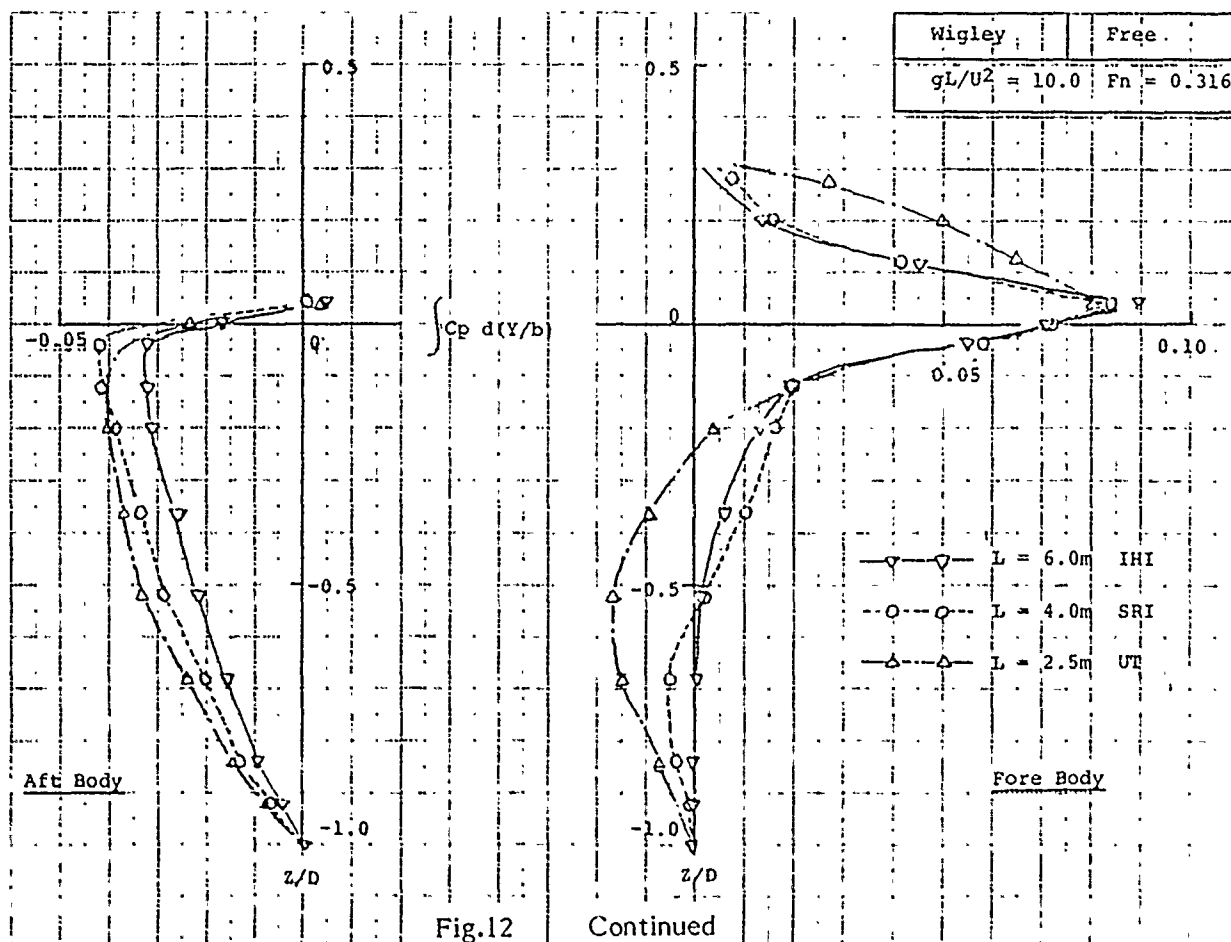
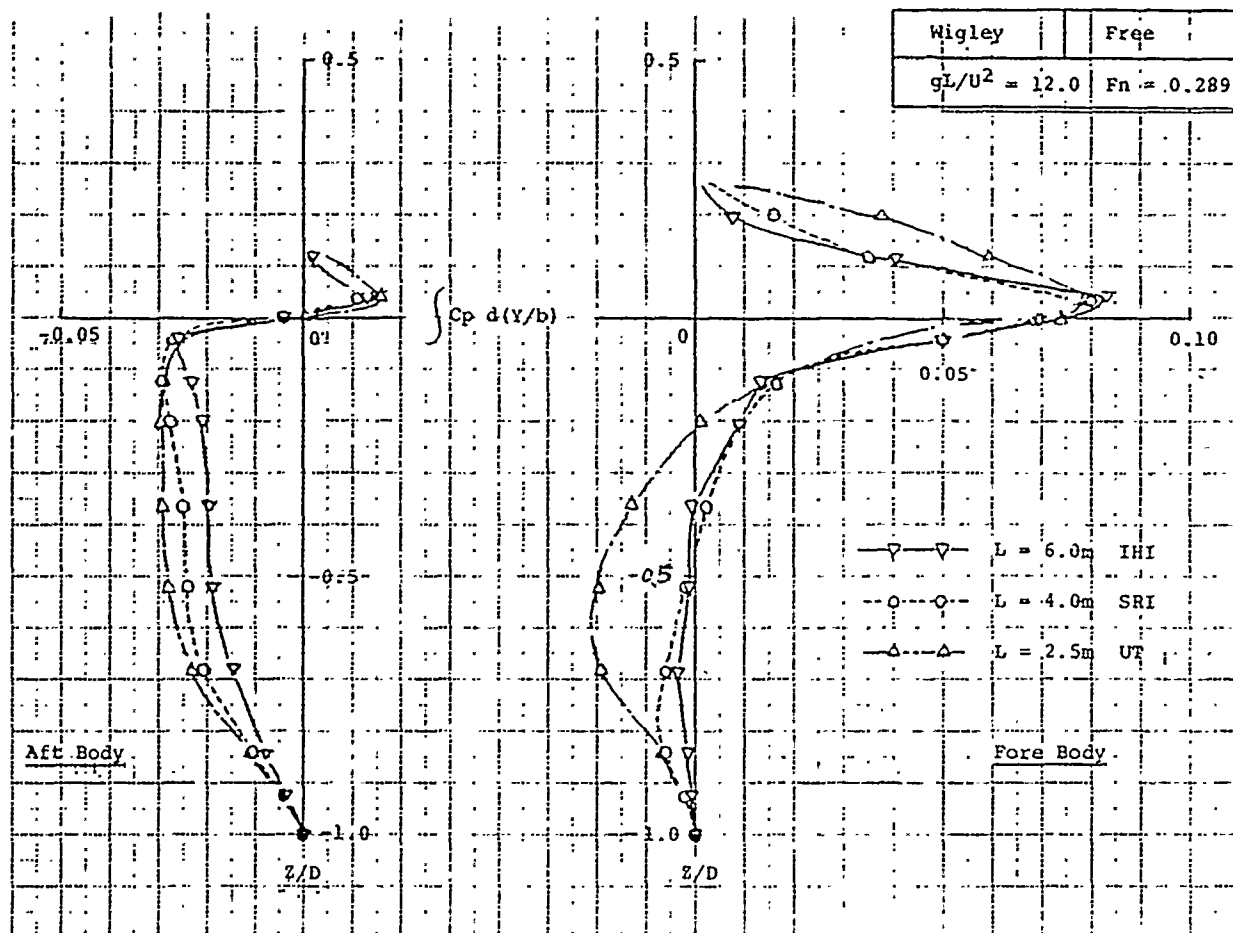


Fig.12

Continued

Table 2 The pressure coefficient on the hull of 6.0m model (FR)

Fn = 0.104 Free L=6.0 m (IHI)												
ST. 2X/L	10.000	9.750	9.500	9.250	9.000	8.500	8.000	7.500	7.000	6.000	5.500	5.000
Z/D	-1.000	-.950	-.900	-.850	-.800	-.700	-.600	-.500	-.400	-.200	-.100	.000
.000	.000	.139	.113	.026	.000	-.014	-.009	-.046	.000	.000	.000	.000
-.040	.959	.135	.100	.022	-.045	-.017	-.014	-.046	-.084	-.046	-.052	-.054
-.120	.968	.126	.077	.014	-.034	-.023	-.024	-.047	-.063	-.046	-.054	-.060
-.200	.976	.117	.058	.008	-.026	-.029	-.033	-.048	-.051	-.046	-.053	-.063
-.360	.987	.098	.035	-.001	-.021	-.038	-.045	-.048	-.046	-.044	-.046	-.060
-.520	.992	.077	.026	-.003	-.022	-.042	-.048	-.047	-.044	-.041	-.040	-.052
-.680	.994	.061	.020	-.004	-.021	-.041	-.045	-.044	-.041	-.036	-.037	-.041
-.840	.994	.049	.020	-.005	-.018	-.035	-.039	-.039	-.036	-.033	-.034	-.038
-.920	.000	.044	.019	-.014	-.016	-.032	-.035	-.035	-.034	-.033	-.033	-.036
-1.000	.000	.040	.018	-.004	-.015	-.028	-.030	-.030	-.031	-.034	-.031	-.037
DIPPING	.0016	.0016	.0016	.0016	.0016	.0015	.0015	.0015	.0015	.0014	.0014	.0014

ST. 2X/L	5.000	4.500	4.000	3.000	2.500	2.000	1.500	1.000	.750	.500	.250	.000
Z/D	.000	.100	.200	.400	.500	.600	.700	.800	.850	.900	.950	1.000
.000	.000	.000	.000	-.037	-.045	.000	.000	-.018	-.001	.030	.083	.159
-.040	-.054	-.055	-.056	-.039	-.045	-.044	-.039	-.017	.001	.031	.083	.157
-.120	-.060	-.057	-.056	-.044	-.044	-.043	-.034	-.015	.004	.035	.084	.156
-.200	-.063	-.058	-.055	-.048	-.045	-.043	-.033	-.013	.005	.036	.084	.159
-.360	-.060	-.057	-.048	-.053	-.048	-.044	-.033	-.012	.003	.030	.080	.151
-.520	-.052	-.054	-.044	-.053	-.052	-.046	-.035	-.018	.007	.018	.070	.147
-.680	-.041	-.052	-.038	-.049	-.049	-.044	-.036	-.024	-.014	.007	.054	.127
-.840	-.038	-.047	-.034	-.043	-.044	-.041	-.034	-.023	-.012	.004	.034	.083
-.920	-.036	-.044	-.032	-.039	-.043	-.039	-.033	-.022	-.009	.004	.024	.054
-1.000	-.037	-.042	-.031	-.034	-.038	-.038	-.032	-.018	-.007	.006	.016	.021
DIPPING	.0014	.0014	.0013	.0013	.0013	.0012	.0012	.0012	.0012	.0012	.0012	.0011

Fn = 0.250 Free L=6.0 m (IHI)												
ST. 2X/L	10.000	9.750	9.500	9.250	9.000	8.500	8.000	7.500	7.000	6.000	5.500	5.000
Z/D	-1.000	-.950	-.900	-.850	-.800	-.700	-.600	-.500	-.400	-.200	-.100	.000
.000	.000	.000	.372	.000	.000	.000	.000	.000	.000	.000	.000	.000
-.040	.000	.266	.325	.239	.000	.000	.000	.000	.000	.000	.000	.000
-.120	.000	.243	.283	.213	.097	.000	.000	.000	.000	.000	.000	.000
-.200	.974	.233	.264	.200	.050	.000	.000	.000	.000	.012	-.007	.000
-.360	.979	.224	.246	.188	.083	-.097	.000	.000	-.080	.011	-.009	-.065
-.520	.986	.205	.216	.165	.071	-.091	-.163	-.153	-.067	.008	-.014	-.068
-.680	.991	.188	.189	.144	.059	-.086	-.158	-.144	-.059	.006	-.018	-.068
-.840	.997	.153	.147	.107	.039	-.077	-.139	-.124	-.055	.001	-.023	-.061
-.920	.998	.130	.116	.077	.024	-.068	-.119	-.101	-.061	-.005	-.026	-.052
-1.000	.998	.105	.093	.054	.014	-.058	-.099	-.092	-.058	-.012	-.027	-.045
	.999	.082	.076	.040	.009	-.046	-.079	-.071	-.052	-.019	-.027	-.041
	.000	.071	.069	.036	.008	-.039	-.070	-.068	-.047	-.023	-.028	-.040
	.000	.061	.063	.034	.006	-.034	-.061	-.065	-.046	-.027	-.028	-.040
DIPPING	.0101	.0100	.0100	.0099	.0098	.0096	.0094	.0092	.0090	.0087	.0085	.0083

ST. 2X/L	5.000	4.500	4.000	3.000	2.500	2.000	1.500	1.000	.750	.500	.250	.000
Z/D	.000	.100	.200	.400	.500	.600	.700	.800	.850	.900	.950	1.000
.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
-.040	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
-.120	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
-.200	.000	.000	-.032	-.022	-.022	-.013	-.029	.000	-.029	-.011	.038	.176
-.360	-.055	-.100	-.034	-.027	-.020	-.012	-.026	-.035	-.026	-.008	.042	.173
-.520	-.058	-.095	-.037	-.034	-.019	-.013	-.022	-.029	-.023	-.005	.048	.173
-.680	-.058	-.090	-.040	-.040	-.020	-.016	-.021	-.026	-.022	-.004	.053	.174
-.840	-.061	-.079	-.045	-.046	-.028	-.024	-.026	-.027	-.023	-.006	.054	.177
-.920	-.052	-.067	-.048	-.047	-.033	-.030	-.031	-.030	-.024	-.007	.048	.170
-1.000	-.045	-.058	-.049	-.046	-.035	-.034	-.033	-.028	-.023	-.005	.039	.147
	-.041	-.052	-.050	-.041	-.033	-.034	-.032	-.025	-.020	-.002	.028	.099
	-.040	-.052	-.049	-.038	-.031	-.032	-.030	-.023	-.016	.000	.022	.064
	-.040	-.051	-.049	-.034	-.029	-.030	-.029	-.020	-.011	.003	.016	.021
DIPPING	.0083	.0081	.0079	.0076	.0074	.0072	.0070	.0068	.0068	.0067	.0066	.0065

Table 2 Continued

Fn = 0.267 Free L=6.0 m (IHI)												
ST. 2X/L	10.000 -1.000	9.750 -.950	9.500 -.900	9.250 -.850	9.000 -.800	8.500 -.700	8.000 -.600	7.500 -.500	7.000 -.400	6.000 -.200	5.500 -.100	5.000 .000
Z/D												
.200	.000	.000	.350	.000	.000	.000	.000	.000	.000	.000	.000	.000
.120	.000	.250	.309	.259	.000	.000	.000	.000	.000	.000	.000	.000
.040	.000	.230	.271	.225	.136	.000	.000	.000	.000	.000	.000	.000
.000	.974	.221	.254	.211	.127	.000	.000	.000	.000	.000	.011	-.009
-.040	.979	.212	.238	.197	.119	-.060	.000	.000	.000	-.007	.010	-.012
-.120	.986	.195	.208	.170	.102	-.058	-.159	-.173	-.123	-.008	.007	-.016
-.200	.991	.178	.183	.147	.087	-.056	-.146	-.163	-.112	-.010	.003	-.018
-.360	.997	.149	.142	.106	.058	-.052	-.131	-.141	-.103	-.012	-.005	-.019
-.520	.998	.124	.113	.075	.037	-.048	-.115	-.119	-.096	-.016	-.012	-.021
-.680	.998	.100	.091	.057	.023	-.043	-.097	-.100	-.081	-.021	-.017	-.024
-.840	.999	.080	.074	.044	.017	-.035	-.076	-.083	-.067	-.026	-.020	-.026
-.920	.000	.069	.067	.041	.016	-.030	-.065	-.075	-.063	-.029	-.020	-.026
-1.000	.000	.059	.061	.040	.016	-.024	-.053	-.064	-.061	-.032	-.021	-.025
DIPPING	.0120	.0119	.0118	.0117	.0116	.0114	.0112	.0110	.0108	.0104	.0102	.0100

ST. 2X/L	5.000 .000	4.500 .100	4.000 .200	3.000 .400	2.500 .500	2.000 .600	1.500 .700	1.000 .800	.750 .850	.500 .900	.250 .950	.000 1.000
Z/D												
.200	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.120	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.185
.040	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.054	.183
.000	-.009	.000	.000	.000	.000	.000	-.025	-.009	.007	.027	.057	.182
-.040	-.012	-.054	-.085	-.085	-.065	-.041	-.023	-.006	.008	.029	.070	.182
-.120	-.016	-.054	-.081	-.084	-.064	-.040	-.019	-.003	.008	.032	.074	.183
-.200	-.018	-.052	-.077	-.083	-.064	-.042	-.018	-.001	.005	.033	.076	.186
-.360	-.019	-.046	-.068	-.077	-.064	-.047	-.024	-.004	.008	.029	.076	.192
-.520	-.021	-.043	-.059	-.070	-.063	-.049	-.029	-.010	-.001	.016	.068	.185
-.680	-.024	-.040	-.052	-.064	-.060	-.051	-.030	-.012	-.008	.009	.056	.157
-.840	-.026	-.038	-.047	-.058	-.055	-.047	-.031	-.012	-.005	.012	.044	.106
-.920	-.026	-.036	-.044	-.054	-.051	-.044	-.030	-.010	.000	.015	.037	.071
-1.000	-.025	-.035	-.042	-.049	-.047	-.041	-.029	-.008	.006	.018	.027	.031
DIPPING	.0100	.0098	.0096	.0092	.0090	.0088	.0086	.0084	.0083	.0082	.0081	.0080

Fn = 0.289 Free L=6.0 m (IHI)												
ST. 2X/L	10.000 -1.000	9.750 -.950	9.500 -.900	9.250 -.850	9.000 -.800	8.500 -.700	8.000 -.600	7.500 -.500	7.000 -.400	6.000 -.200	5.500 -.100	5.000 .000
Z/D												
.200	.000	.000	.310	.291	.000	.000	.000	.000	.000	.000	.000	.000
.120	.000	.225	.279	.259	.187	.000	.000	.000	.000	.000	.000	.000
.040	.000	.205	.250	.229	.165	.000	.000	.000	.000	.000	.000	.000
.000	.968	.196	.236	.214	.154	-.020	.000	.000	.000	.000	-.014	.006
-.040	.972	.188	.222	.200	.144	-.020	.000	.000	.000	-.057	-.015	.002
-.120	.979	.173	.198	.175	.124	-.020	-.120	-.171	-.160	-.057	-.018	-.003
-.200	.985	.159	.176	.152	.106	-.020	-.113	-.165	-.150	-.057	-.020	-.009
-.360	.993	.137	.139	.113	.075	-.020	-.101	-.146	-.134	-.054	-.026	-.015
-.520	.997	.118	.111	.087	.054	-.019	-.089	-.121	-.117	-.049	-.028	-.018
-.680	.998	.098	.090	.068	.041	-.019	-.075	-.100	-.100	-.048	-.029	-.022
-.840	.998	.077	.074	.054	.032	-.017	-.060	-.079	-.084	-.050	-.031	-.022
-.920	.000	.066	.067	.049	.028	-.016	-.053	-.073	-.079	-.052	-.033	-.024
-1.000	.000	.056	.061	.045	.024	-.014	-.046	-.068	-.074	-.053	-.035	-.025
DIPPING	.0127	.0126	.0126	.0125	.0125	.0124	.0123	.0123	.0122	.0120	.0120	.0119

ST. 2X/L	5.000 .000	4.500 .100	4.000 .200	3.000 .400	2.500 .500	2.000 .600	1.500 .700	1.000 .800	.750 .850	.500 .900	.250 .950	.000 1.000
Z/D												
.200	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.120	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.175
.040	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.055	.178
.000	.005	-.003	-.025	.000	.000	.000	.000	-.040	-.019	.010	.069	.180
-.040	-.002	-.005	-.026	-.071	-.050	-.032	-.058	-.039	-.017	.013	.072	.182
-.120	-.003	-.009	-.027	-.072	-.079	-.078	-.065	-.036	-.014	.017	.076	.186
-.200	-.009	-.012	-.028	-.071	-.078	-.076	-.064	-.036	-.014	.016	.078	.191
-.360	-.015	-.016	-.029	-.065	-.074	-.076	-.066	-.041	-.020	.010	.073	.193
-.520	-.018	-.018	-.029	-.060	-.071	-.074	-.066	-.046	-.028	.001	.051	.191
-.680	-.022	-.024	-.028	-.056	-.066	-.070	-.064	-.046	-.029	-.003	.049	.165
-.840	-.022	-.024	-.028	-.051	-.059	-.064	-.060	-.041	-.024	.000	.038	.112
-.920	-.024	-.025	-.027	-.047	-.056	-.061	-.056	-.037	-.020	.003	.031	.075
-1.000	-.025	-.025	-.026	-.044	-.053	-.058	-.053	-.033	-.013	.007	.023	.030
DIPPING	.0119	.0118	.0117	.0116	.0115	.0114	.0113	.0113	.0112	.0112	.0111	.0111

Table 2 Continued

Fn = 0.316 Free L=6.0 m (IHI)												
ST. Z/L	10.000	9.750	9.500	9.250	9.000	8.500	8.000	7.500	7.000	6.000	5.500	5.000
Z/L	-1.000	-.950	-.900	-.850	-.800	-.700	-.600	-.500	-.400	-.200	-.100	.000
.200	.000	.213	.260	.261	.233	.000	.000	.000	.000	.000	.000	.000
.120	.000	.196	.238	.233	.203	.000	.000	.000	.000	.000	.000	.000
.040	.000	.181	.217	.208	.175	.038	.000	.000	.000	.000	.000	.000
.000	.000	.174	.206	.196	.162	.038	.000	.000	.000	.000	.000	.000
-.040	.000	.168	.197	.184	.150	.033	-.056	.000	.000	.000	.000	-.042
-.120	.000	.157	.177	.163	.128	.027	-.050	-.133	-.169	-.124	-.078	-.046
-.200	.000	.146	.159	.143	.110	.022	-.053	-.133	-.159	-.118	-.076	-.047
-.300	.000	.128	.130	.110	.083	.014	-.057	-.125	-.141	-.103	-.074	-.045
-.400	.000	.110	.106	.086	.065	.008	-.060	-.107	-.122	-.089	-.068	-.043
-.500	.000	.092	.086	.069	.050	.005	-.048	-.085	-.102	-.080	-.061	-.043
-.600	.000	.072	.069	.057	.040	.005	-.036	-.068	-.086	-.077	-.056	-.044
-.700	.000	.051	.052	.048	.038	.006	-.032	-.062	-.081	-.076	-.061	-.045
-.800	.000	.050	.056	.048	.036	.008	-.027	-.059	-.077	-.077	-.063	-.045
DIFFING	.0173	.0172	.0171	.0169	.0168	.0165	.0162	.0160	.0157	.0152	.0149	.0146

ST. Z/L	5.000	4.500	4.000	3.000	2.500	2.000	1.500	1.000	.750	.500	.250	.000
Z/L	.000	.100	.200	.400	.500	.600	.700	.800	.850	.900	.950	1.000
.200	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.120	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.040	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.000	-.042	-.016	-.009	-.022	-.039	.000	.000	.000	.000	-.041	.003	.098
-.040	-.043	-.019	-.010	-.022	-.038	-.053	-.062	-.061	-.054	-.040	.005	.105
-.120	-.046	-.023	-.011	-.023	-.035	-.052	-.061	-.058	-.052	-.037	.008	.117
-.200	-.047	-.025	-.013	-.023	-.035	-.051	-.059	-.057	-.051	-.037	.009	.127
-.300	-.045	-.026	-.017	-.022	-.036	-.051	-.059	-.058	-.052	-.039	.010	.140
-.400	-.043	-.028	-.021	-.023	-.038	-.050	-.059	-.059	-.055	-.040	.005	.138
-.500	-.043	-.030	-.022	-.026	-.038	-.050	-.057	-.057	-.054	-.039	.000	.116
-.600	-.044	-.032	-.023	-.026	-.036	-.047	-.053	-.050	-.046	-.032	-.004	.065
-.700	-.045	-.033	-.023	-.024	-.034	-.045	-.052	-.047	-.041	-.027	-.008	.030
-.800	-.045	-.034	-.023	-.021	-.032	-.044	-.051	-.043	-.033	-.022	-.012	-.008
DIFFING	.0146	.0143	.0141	.0135	.0132	.0130	.0127	.0124	.0123	.0122	.0120	.0119

Table 3 The pressure coefficient on the hull of 4.0m model (FR)

Fn = 0.250 Free L=4.0 m (SRI)												
ST. 2X/L	10.000	9.750	9.500	9.250	9.000	8.500	8.000	7.500	7.000	6.000	5.500	5.000
Z/D	-1.000	-.950	-.900	-.850	-.800	-.700	-.600	-.500	-.400	-.200	-.100	.000
.200	.000	.000	.326	.000	.000	.000	.000	.000	.000	.000	.000	.000
.120	1.000	.278	.311	.216	.000	.000	.000	.000	.000	.000	.000	.000
.040	1.000	.246	.274	.194	.066	.000	.000	.000	.000	.000	.000	.000
-.040	1.000	.217	.204	.174	.053	-.109	.000	.000	.000	.004	-.018	-.072
-.120	1.000	.197	.179	.154	.049	-.105	-.169	-.146	-.067	-.007	-.022	-.099
-.200	1.000	.182	.162	.132	.047	-.096	-.158	-.131	-.069	-.013	-.028	-.098
-.350	1.000	.154	.123	.090	.030	-.073	-.131	-.111	-.070	-.026	-.043	-.061
-.520	1.000	.124	.090	.058	.002	-.070	-.112	-.094	-.065	-.030	-.033	-.046
-.680	1.000	.060	.054	.013	-.005	-.054	-.086	-.077	-.054	-.035	-.035	-.052
-.840	1.000	.060	.054	.013	-.005	-.054	-.086	-.077	-.054	-.034	-.028	-.039
-.920	1.000	.057	.052	.011	-.015	-.051	-.078	-.078	-.056	-.036	-.025	-.046
-1.000	1.000	.063	.017	.023	.011	-.054	-.054	-.063	-.058	-.030	-.029	-.074
DIPPING	.0070	.0069	.0068	.0068	.0067	.0066	.0065	.0063	.0062	.0060	.0058	.0057

ST. 2X/L	5.000	4.500	4.000	3.000	2.500	2.000	1.500	1.000	.750	.500	.250	.000
Z/D	.000	.100	.200	.400	.500	.600	.700	.800	.850	.900	.950	1.000
.200	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.120	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.040	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.045	.070
-.040	-.072	-.099	-.102	-.048	-.039	-.027	-.028	-.044	-.038	-.031	.029	.059
-.120	-.099	-.088	-.103	-.050	-.032	-.022	-.035	-.048	-.034	-.031	.037	.114
-.200	-.098	-.081	-.096	-.054	-.041	-.022	-.038	-.047	-.034	-.030	.042	.127
-.350	-.061	-.072	-.091	-.056	-.046	-.029	-.036	-.042	-.034	-.024	.042	.144
-.520	-.046	-.066	-.075	-.061	-.045	-.032	-.044	-.049	-.038	-.027	.035	.114
-.680	-.052	-.057	-.058	-.051	-.043	-.026	-.050	-.044	-.042	-.026	.022	.083
-.840	-.039	-.045	-.062	-.051	-.039	-.035	-.042	-.044	-.040	-.018	.014	.050
-.920	-.046	-.052	-.048	-.043	-.038	-.035	-.039	-.053	-.038	-.005	.010	.020
-1.000	-.074	-.062	-.061	-.074	-.036	-.063	-.033	-.038	-.006	-.030	-.018	.002
DIPPING	.0057	.0056	.0054	.0052	.0051	.0049	.0048	.0047	.0046	.0046	.0045	.0044

Fn = 0.267 Free L=4.0 m (SRI)												
ST. 2X/L	10.000	9.750	9.500	9.250	9.000	8.500	8.000	7.500	7.000	6.000	5.500	5.000
Z/D	-1.000	-.950	-.900	-.850	-.800	-.700	-.600	-.500	-.400	-.200	-.100	.000
.200	1.000	.312	.334	.000	.000	.000	.000	.000	.000	.000	.000	.000
.120	1.000	.259	.303	.232	.000	.000	.000	.000	.000	.000	.000	.000
.040	1.000	.226	.252	.213	.112	.000	.000	.000	.000	.000	.015	.022
-.040	1.000	.204	.203	.187	.090	-.049	.000	.000	-.114	-.012	.004	-.028
-.120	1.000	.189	.177	.165	.081	-.051	-.155	-.177	-.114	-.022	-.004	-.053
-.200	1.000	.175	.162	.144	.077	-.053	-.146	-.157	-.110	-.027	-.009	-.014
-.350	1.000	.153	.127	.102	.053	-.041	-.123	-.130	-.104	-.038	-.029	-.035
-.520	1.000	.125	.095	.070	.021	-.043	-.104	-.107	-.089	-.039	-.022	-.025
-.680	1.000	.095	.079	.043	.013	-.047	-.096	-.097	-.085	-.042	-.027	-.036
-.840	1.000	.063	.060	.023	.008	-.038	-.081	-.084	-.067	-.041	-.022	-.027
-.920	1.000	-.060	-.058	-.020	-.003	-.036	-.073	-.086	-.069	-.042	-.020	-.036
-1.000	1.000	.066	.022	.031	.022	-.039	-.048	-.069	-.072	-.036	-.024	-.062
DIPPING	.0079	.0078	.0077	.0077	.0076	.0075	.0074	.0073	.0072	.0070	.0069	.0068

ST. 2X/L	5.000	4.500	4.000	3.000	2.500	2.000	1.500	1.000	.750	.500	.250	.000
Z/D	.000	.100	.200	.400	.500	.600	.700	.800	.850	.900	.950	1.000
.200	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.120	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.040	.022	.000	.000	.000	.000	.000	.000	.000	.000	.014	.051	.101
-.040	-.028	-.054	-.084	-.084	-.075	-.043	-.014	-.010	.000	.007	.058	.116
-.120	-.053	-.046	-.088	-.088	-.069	-.039	-.022	-.013	.001	.006	.064	.123
-.200	-.014	-.043	-.081	-.088	-.075	-.038	-.025	-.015	.002	.006	.069	.128
-.350	-.035	-.041	-.077	-.082	-.074	-.045	-.025	-.014	-.001	.009	.067	.121
-.520	-.025	-.043	-.062	-.081	-.069	-.048	-.036	-.026	-.009	.001	.061	.137
-.680	-.036	-.039	-.059	-.067	-.064	-.040	-.043	-.022	-.016	.001	.046	.100
-.840	-.027	-.032	-.054	-.064	-.055	-.046	-.035	-.024	-.017	.006	.037	.069
-.920	-.036	-.040	-.042	-.057	-.053	-.046	-.030	-.033	-.025	.021	.035	.043
-1.000	-.062	-.050	-.054	-.088	-.049	-.076	-.024	-.020	.020	-.008	.004	.025
DIPPING	.0068	.0067	.0066	.0064	.0063	.0062	.0061	.0060	.0059	.0059	.0058	.0057

Table 3 Continued

Fn = 0.289 Free L=4.0 m (SRI)												
ST. 2X/L	10.000	9.750	9.500	9.250	9.000	8.500	8.000	7.500	7.000	6.000	5.500	5.000
Z/D	-1.000	-.950	-.900	-.850	-.800	-.700	-.600	-.500	-.400	-.200	-.100	.000
.200	1.000	.259	.321	.260	.000	.000	.000	.000	.000	.000	.000	.000
.120	1.000	.229	.269	.239	.161	.081	.000	.000	.000	.000	.000	.000
.040	1.000	.200	.228	.211	.142	.014	.000	.000	.000	.000	.011	.006
-.040	1.000	.186	.191	.186	.117	.007	-.092	-.125	.000	-.060	-.020	-.016
-.120	1.000	.174	.171	.166	.107	-.002	-.117	-.183	-.153	-.069	-.023	-.041
-.200	1.000	.165	.153	.146	.098	-.008	-.112	-.157	-.147	-.069	-.031	-.018
-.360	1.000	.146	.124	.103	.069	-.006	-.097	-.132	-.132	-.074	-.048	-.035
-.520	1.000	.120	.096	.074	.034	-.017	-.083	-.107	-.114	-.069	-.038	-.046
-.680	1.000	.093	.080	.047	.026	-.025	-.079	-.096	-.104	-.066	-.040	-.048
-.840	1.000	.062	.062	.026	.019	-.021	-.067	-.083	-.081	-.060	-.032	-.049
-.920	1.000	.059	.061	.025	.007	-.020	-.059	-.083	-.082	-.059	-.028	-.040
-1.000	1.000	.066	.023	.037	.032	-.025	-.037	-.067	-.083	-.051	-.032	-.060
DIPPING	.0037	.0037	.0037	.0037	.0036	.0036	.0036	.0035	.0035	.0034	.0034	.0033

ST. 2X/L	5.000	4.500	4.000	3.000	2.500	2.000	1.500	1.000	.750	.500	.250	.000
Z/D	.000	.100	.200	.400	.500	.600	.700	.800	.850	.900	.950	1.000
.200	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.120	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.040	.006	.000	.000	.000	.000	.000	.000	.000	.000	.001	.018	.170
-.040	-.016	-.013	-.032	-.058	-.088	-.076	-.056	-.043	-.026	-.003	.078	.166
-.120	-.041	-.008	-.040	-.074	-.081	-.072	-.064	-.047	-.022	-.004	.076	.167
-.200	-.018	-.008	-.035	-.072	-.085	-.071	-.066	-.053	-.022	-.004	.074	.168
-.360	-.035	-.013	-.038	-.068	-.081	-.068	-.063	-.045	-.026	.003	.066	.152
-.520	-.046	-.021	-.031	-.069	-.073	-.069	-.071	-.056	-.035	-.011	.057	.141
-.680	-.048	-.022	-.028	-.056	-.066	-.069	-.074	-.051	-.040	-.012	.039	.102
-.840	-.049	-.017	-.033	-.054	-.058	-.061	-.062	-.050	-.038	-.006	.028	.060
-.920	-.040	-.027	-.023	-.049	-.057	-.061	-.056	-.059	-.047	-.010	.026	.037
-1.000	-.060	-.039	-.038	-.083	-.054	-.052	-.048	-.044	.004	-.016	-.007	.006
DIPPING	.0023	.0023	.0023	.0022	.0022	.0021	.0021	.0021	.0020	.0020	.0020	.0020

Fn = 0.316 Free L=4.0 m (SRI)												
ST. 2X/L	10.000	9.750	9.500	9.250	9.000	8.500	8.000	7.500	7.000	6.000	5.500	5.000
Z/D	-1.000	-.950	-.900	-.850	-.800	-.700	-.600	-.500	-.400	-.200	-.100	.000
.200	1.000	.000	.319	.000	.000	.000	.000	.000	.000	.000	.000	.000
.120	1.000	.226	.284	.251	.000	.000	.000	.000	.000	.000	.000	.000
.040	1.000	.196	.242	.231	.180	.000	.000	.000	.000	.000	.000	.000
-.040	1.000	.178	.204	.199	.153	.065	.000	.000	.000	.000	.000	.000
-.120	1.000	.169	.178	.177	.133	.058	-.059	.000	.000	.000	-.075	-.053
-.200	1.000	.162	.159	.159	.120	.048	-.058	-.163	-.175	-.122	-.077	-.071
-.360	1.000	.155	.143	.141	.109	.035	-.070	-.139	-.161	-.120	-.081	-.094
-.520	1.000	.140	.117	.106	.079	.029	-.065	-.117	-.142	-.118	-.095	-.070
-.680	1.000	.117	.094	.076	.043	.013	-.057	-.096	-.121	-.104	-.075	-.046
-.840	1.000	.090	.080	.050	.035	-.001	-.058	-.085	-.110	-.095	-.071	-.062
-.920	1.000	.051	.064	.029	.026	-.003	-.051	-.074	-.086	-.085	-.060	-.045
-1.000	1.000	.060	.078	.030	.014	-.003	-.044	-.075	-.086	-.084	-.054	-.058
DIPPING	.0117	.0116	.0115	.0114	.0114	.0112	.0110	.0109	.0107	.0104	.0102	.0100

ST. 2X/L	5.000	4.500	4.000	3.000	2.500	2.000	1.500	1.000	.750	.500	.250	.000
Z/D	.000	.100	.200	.400	.500	.600	.700	.800	.850	.900	.950	1.000
.200	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.120	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.040	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
-.040	-.053	-.028	-.019	-.024	-.051	-.059	-.054	-.059	-.057	-.052	-.018	.027
-.120	-.071	-.027	-.024	-.028	-.043	-.047	-.063	-.067	-.064	-.054	-.008	.042
-.200	-.094	-.022	-.022	-.031	-.048	-.042	-.065	-.067	-.053	-.054	.001	.062
-.360	-.070	-.028	-.030	-.031	-.048	-.046	-.060	-.062	-.056	-.048	.004	.083
-.520	-.046	-.035	-.025	-.039	-.045	-.048	-.066	-.069	-.060	-.051	.004	.031
-.680	-.062	-.034	-.024	-.030	-.042	-.037	-.069	-.062	-.063	-.047	-.008	.037
-.840	-.045	-.029	-.032	-.034	-.039	-.047	-.057	-.059	-.059	-.034	-.012	.011
-.920	-.058	-.038	-.021	-.028	-.038	-.048	-.051	-.069	-.068	-.018	-.010	-.034
-1.000	-.068	-.050	-.036	-.063	-.037	-.079	-.047	-.055	-.021	-.049	-.043	-.035
DIPPING	.0100	.0098	.0097	.0094	.0092	.0091	.0088	.0088	.0087	.0086	.0085	.0084

Table 4 The pressure coefficient on the hull of 2.5m model (FR)

Fn = 0.250 Free L=2.5 m (UT)													
ST. 2x/L Z/D	10.000	9.750	9.500	9.250	9.000	8.000	7.000	6.000	5.000				
	-1.000	-0.950	-0.900	-0.850	-0.800	-0.750	-0.700	-0.600	-0.500	0.000	0.000	0.000	0.000
0.000	.0000	.286	.296	.217	.000	.000	.000	.000	.000	.000	.000	.000	.000
.120	.936	.251	.239	.198	.055	.000	.000	.000	.000	.000	.000	.000	.000
.240	.930	.242	.224	.187	.056	.000	.000	.000	.000	.000	.000	.000	.000
.360	.999	.176	.149	.126	.045	.000	.000	.000	.000	.000	.000	.000	.000
.480	1.000	.125	.113	.086	.027	.000	.000	.000	.000	.000	.000	.000	.000
.600	1.000	.089	.089	.057	.011	.000	.000	.000	.000	.000	.000	.000	.000
.720	1.000	.068	.068	.036	.002	.000	.000	.000	.000	.000	.000	.000	.000
.840	1.000	.051	.049	.020	.001	.000	.000	.000	.000	.000	.000	.000	.000
1.000	.000	.043	.049	.003	.001	.000	.000	.000	.000	.000	.000	.000	.000
DIPPING	.0040	.0039	.0039	.0039	.0039	.0038	.0037	.0036	.0035				

Fn = 0.267 Free L=2.5 m (UT)													
ST. 2x/L Z/D	10.000	9.750	9.500	9.250	9.000	8.000	7.000	6.000	5.000				
	-1.000	-0.950	-0.900	-0.850	-0.800	-0.750	-0.700	-0.600	-0.500	0.000	0.000	0.000	0.000
0.000	.0000	.279	.326	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
.120	.748	.247	.277	.238	.101	.000	.000	.000	.000	.000	.000	.000	.000
.240	.510	.218	.237	.206	.101	.000	.000	.000	.000	.000	.000	.000	.000
.360	.572	.209	.220	.204	.071	.000	.000	.000	.000	.000	.000	.000	.000
.480	.997	.157	.146	.144	.045	.000	.000	.000	.000	.000	.000	.000	.000
.600	1.000	.116	.103	.098	.045	.000	.000	.000	.000	.000	.000	.000	.000
.720	1.000	.085	.083	.068	.021	.000	.000	.000	.000	.000	.000	.000	.000
.840	1.000	.064	.068	.044	.001	.000	.000	.000	.000	.000	.000	.000	.000
1.000	.000	.049	.049	.006	.000	.000	.000	.000	.000	.000	.000	.000	.000
DIPPING	.0044	.0044	.0044	.0044	.0043	.0043	.0042	.0041	.0041				

Fn = 0.289 Free L=2.5 m (UT)													
ST. 2x/L Z/D	10.000	9.750	9.500	9.250	9.000	8.000	7.000	6.000	5.000				
	-1.000	-0.950	-0.900	-0.850	-0.800	-0.750	-0.700	-0.600	-0.500	0.000	0.000	0.000	0.000
0.000	.0000	.249	.249	.245	.245	.245	.245	.245	.245	.000	.000	.000	.000
.120	.000	.218	.243	.218	.218	.218	.218	.218	.218	.000	.000	.000	.000
.240	.000	.195	.205	.227	.227	.227	.227	.227	.227	.000	.000	.000	.000
.360	.000	.175	.178	.218	.218	.218	.218	.218	.218	.000	.000	.000	.000
.480	.000	.151	.171	.218	.218	.218	.218	.218	.218	.000	.000	.000	.000
.600	.000	.131	.124	.135	.135	.135	.135	.135	.135	.000	.000	.000	.000
.720	.000	.109	.093	.098	.098	.098	.098	.098	.098	.000	.000	.000	.000
.840	.000	.073	.078	.068	.068	.068	.068	.068	.068	.000	.000	.000	.000
1.000	.000	.046	.053	.025	.025	.025	.025	.025	.025	.000	.000	.000	.000
DIPPING	.0058	.0058	.0057	.0057	.0057	.0056	.0056	.0056	.0056				

Fn = 0.316 Free L=2.5 m (UT)													
ST. 2x/L Z/D	10.000	9.750	9.500	9.250	9.000	8.000	7.000	6.000	5.000				
	-1.000	-0.950	-0.900	-0.850	-0.800	-0.750	-0.700	-0.600	-0.500	0.000	0.000	0.000	0.000
0.000	.0000	.249	.249	.245	.245	.245	.245	.245	.245	.000	.000	.000	.000
.120	.000	.218	.243	.218	.218	.218	.218	.218	.218	.000	.000	.000	.000
.240	.000	.195	.205	.227	.227	.227	.227	.227	.227	.000	.000	.000	.000
.360	.000	.175	.178	.218	.218	.218	.218	.218	.218	.000	.000	.000	.000
.480	.000	.151	.171	.218	.218	.218	.218	.218	.218	.000	.000	.000	.000
.600	.000	.131	.124	.135	.135	.135	.135	.135	.135	.000	.000	.000	.000
.720	.000	.109	.093	.098	.098	.098	.098	.098	.098	.000	.000	.000	.000
.840	.000	.073	.078	.068	.068	.068	.068	.068	.068	.000	.000	.000	.000
1.000	.000	.046	.053	.025	.025	.025	.025	.025	.025	.000	.000	.000	.000
DIPPING	.0062	.0062	.0061	.0061	.0061	.0061	.0061	.0061	.0061				

Fn = 0.362 Free L=2.5 m (UT)													
ST. 2x/L Z/D	10.000	9.750	9.500	9.250	9.000	8.000	7.000	6.000	5.000				
	-1.000	-0.950	-0.900	-0.850	-0.800	-0.750	-0.700	-0.600	-0.500	0.000	0.000	0.000	0.000
0.000	.0000	.249	.249	.245	.245	.245	.245	.245	.245	.000	.000	.000	.000
.120	.000	.218	.243	.218	.218	.218	.218	.218	.218	.000	.000	.000	.000
.240	.000	.195	.205	.227	.227	.227	.227	.227	.227	.000	.000	.000	.000
.360	.000	.175	.178	.218	.218	.218	.218	.218	.218	.000	.000	.000	.000
.480	.000	.151	.171	.218	.218	.218	.218	.218	.218	.000	.000	.000	.000
.600	.000	.131	.124	.135	.135	.135	.135	.135	.135	.000	.000	.000	.000
.720	.000	.109	.093	.098	.098	.098	.098	.098	.098	.000	.000	.000	.000
.840	.000	.073	.078	.068	.068	.068	.068	.068	.068	.000	.000	.000	.000
1.000	.000	.046	.053	.025	.025	.025	.025	.025	.025	.000	.000	.000	.000
DIPPING	.0062	.0062	.0061	.0061	.0061	.0061	.0061	.0061	.0061				

Table 5 The pressure coefficient on the hull of 2.5m model (FX)

Fn = 0.250 Fixed L=2.5 m (UT)												
ST.	10.000	9.750	9.500	9.250	9.000	8.750	8.500	8.250	8.000	7.750	7.500	5.000
2x/L	-1.000	-0.900	-0.800	-0.700	-0.600	-0.500	-0.400	-0.300	-0.200	-0.100	0.000	5.000
Z/D	.000	.305	.318	.000	.000	.000	.000	.000	.000	.000	.000	.000
.120	.000	.265	.267	.237	.000	.000	.000	.000	.000	.000	.000	.000
.140	.000	.247	.246	.213	.000	.000	.000	.000	.000	.000	.000	.000
.160	.000	.217	.213	.187	.000	.000	.000	.000	.000	.000	.000	.000
.180	.000	.171	.166	.137	.039	.000	.000	.000	.000	.000	.000	.000
.200	.000	.124	.124	.095	.017	.000	.000	.000	.000	.000	.000	.000
.220	.000	.091	.098	.065	.011	.000	.000	.000	.000	.000	.000	.000
.240	.000	.058	.075	.043	.000	.000	.000	.000	.000	.000	.000	.000
.260	.000	.032	.055	.025	.000	.000	.000	.000	.000	.000	.000	.000
.280	.000	.042	.047	.016	.000	.000	.000	.000	.000	.000	.000	.000
.300	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
DIFFING	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Fn = 0.267 Fixed L=2.5 m (UT)												
ST.	10.000	9.750	9.500	9.250	9.000	8.750	8.500	8.250	8.000	7.750	7.500	5.000
2x/L	-1.000	-0.950	-0.900	-0.850	-0.800	-0.750	-0.700	-0.650	-0.600	-0.550	-0.500	5.000
Z/D	.000	.273	.310	.244	.000	.000	.000	.000	.000	.000	.000	.000
.120	.000	.239	.263	.226	.072	.000	.000	.000	.000	.000	.000	.000
.140	.000	.225	.241	.216	.060	.000	.000	.000	.000	.000	.000	.000
.160	.000	.208	.225	.200	.053	.000	.000	.000	.000	.000	.000	.000
.180	.000	.188	.204	.179	.046	.000	.000	.000	.000	.000	.000	.000
.200	.000	.166	.182	.157	.039	.000	.000	.000	.000	.000	.000	.000
.220	.000	.144	.160	.135	.032	.000	.000	.000	.000	.000	.000	.000
.240	.000	.122	.138	.113	.025	.000	.000	.000	.000	.000	.000	.000
.260	.000	.100	.116	.091	.018	.000	.000	.000	.000	.000	.000	.000
.280	.000	.078	.094	.069	.011	.000	.000	.000	.000	.000	.000	.000
.300	.000	.056	.072	.047	.004	.000	.000	.000	.000	.000	.000	.000
DIFFING	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Fn = 0.289 Fixed L=2.5 m (UT)												
ST.	10.000	9.750	9.500	9.250	9.000	8.750	8.500	8.250	8.000	7.750	7.500	5.000
2x/L	-1.000	-0.900	-0.800	-0.700	-0.600	-0.500	-0.400	-0.300	-0.200	-0.100	0.000	5.000
Z/D	.000	.310	.328	.000	.000	.000	.000	.000	.000	.000	.000	.000
.120	.000	.268	.267	.237	.000	.000	.000	.000	.000	.000	.000	.000
.140	.000	.247	.246	.213	.000	.000	.000	.000	.000	.000	.000	.000
.160	.000	.217	.213	.187	.000	.000	.000	.000	.000	.000	.000	.000
.180	.000	.171	.166	.137	.039	.000	.000	.000	.000	.000	.000	.000
.200	.000	.124	.124	.095	.017	.000	.000	.000	.000	.000	.000	.000
.220	.000	.091	.098	.065	.011	.000	.000	.000	.000	.000	.000	.000
.240	.000	.058	.075	.043	.000	.000	.000	.000	.000	.000	.000	.000
.260	.000	.032	.055	.025	.000	.000	.000	.000	.000	.000	.000	.000
.280	.000	.042	.047	.016	.000	.000	.000	.000	.000	.000	.000	.000
.300	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
DIFFING	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Fn = 0.316 Fixed L=2.5 m (UT)												
ST.	10.000	9.750	9.500	9.250	9.000	8.750	8.500	8.250	8.000	7.750	7.500	5.000
2x/L	-1.000	-0.950	-0.900	-0.850	-0.800	-0.750	-0.700	-0.650	-0.600	-0.550	-0.500	5.000
Z/D	.000	.257	.365	.000	.000	.000	.000	.000	.000	.000	.000	.000
.120	.000	.213	.297	.255	.167	.000	.000	.000	.000	.000	.000	.000
.140	.000	.187	.238	.222	.153	.000	.000	.000	.000	.000	.000	.000
.160	.000	.177	.213	.205	.154	.000	.000	.000	.000	.000	.000	.000
.180	.000	.166	.192	.186	.146	.000	.000	.000	.000	.000	.000	.000
.200	.000	.152	.172	.166	.132	.000	.000	.000	.000	.000	.000	.000
.220	.000	.132	.152	.146	.108	.000	.000	.000	.000	.000	.000	.000
.240	.000	.110	.130	.124	.094	.000	.000	.000	.000	.000	.000	.000
.260	.000	.088	.108	.102	.077	.000	.000	.000	.000	.000	.000	.000
.280	.000	.066	.086	.080	.054	.000	.000	.000	.000	.000	.000	.000
.300	.000	.044	.064	.058	.032	.000	.000	.000	.000	.000	.000	.000
DIFFING	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Fn = 0.360 Fixed L=2.5 m (UT)												
ST.	10.000	9.750	9.500	9.250	9.000	8.750	8.500	8.250	8.000	7.750	7.500	5.000
2x/L	-1.000	-0.900	-0.800	-0.700	-0.600	-0.500	-0.400	-0.300	-0.200	-0.100	0.000	5.000
Z/D	.000	.300	.318	.000	.000	.000	.000	.000	.000	.000	.000	.000
.120	.000	.265	.267	.237	.000	.000	.000	.000	.000	.000	.000	.000
.140	.000	.247	.246	.213	.000	.000	.000	.000	.000	.000	.000	.000
.160	.000	.217	.213	.187	.000	.000	.000	.000	.000	.000	.000	.000
.180	.000	.171	.166	.137	.039	.000	.000	.000	.000	.000	.000	.000
.200	.000	.124	.124	.095	.017	.000	.000	.000	.000	.000	.000	.000
.220	.000	.091	.098	.065	.011	.000	.000	.000	.000	.000	.000	.000
.240	.000	.058	.075	.043	.000	.000	.000	.000	.000	.000	.000	.000
.260	.000	.032	.055	.025	.000	.000	.000	.000	.000	.000	.000	.000
.280	.000	.042	.047	.016	.000	.000	.000	.000	.000	.000	.000	.000
.300	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
DIFFING	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000